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A REPORT ON AN EPIDEMIC OF SEPTIC INFECTION OCCURRING IN A MATERNITY HOSPITAL.

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LATE in July, 1927, the medical officer of health of a Melbourne municipality received a letter signed by six practitioners requesting him to obtain the services of the Director of Obstetrical Research for a full investigation of the circumstances arising out of the deaths of a mother and two infants and the serious infection of a third infant, all of whom were inmates of a private hospital in the city. The medical men felt that it was too great a responsibility for them to allow further patients to go to this hospital, unless an independent authority after investigation declared it to be safe. The matron of the hospital was advised of the action taken and agreed to refuse admission to patients until the investigation was completed. A round table conference was held and the facts concerning the epidemic were elicited. The history of the cases was briefly as follows:

Case Histories.

Maternal Death.

Mrs. V., aged thirty-three, had one normal delivery four years ago. She was seen early in the present pregnancy, but owing to change of address her doctor lost sight of her until she was admitted to hospital on April 9. Delivery was over before his arrival. No vaginal examinations were made, there were no perineal lacerations and the third stage was perfectly normal. Except for a rise of temperature to 37·8° C. (100° F.) with a pulse rate of 72 on the third evening, the puerperium was aferbrile and the patient was allowed up on April 21 and 22. The following day a temperature of 39·4° C. (103° F.) and a pulse rate of 100 occurred and this continued until April 27 when the temperature became 40·5° C. (105° F.) and the pulse rate 120 and the patient was sent to the Women's Hospital. Despite diligent investigation during this period no focus of infection could be discovered. On admittance to the Women's Hospital the patient was acutely ill and semi-delirious. Although she complained of abdominal pain, there was no tenderness nor rigidity. Pelvic examination revealed no abnormality, except that the left ovary could be easily palpated. Hæmolytic streptococci were isolated from the blood on April 29 and on May 1 and 4. Three injections of mercurochrome and one blood transfusion were given and on May 5 the blood yielded no organisms on culture. However, pyæmia supervened and death took place on June 4 after an illness of eight weeks. *Post mortem* the uterus was found to be small, the uterine appendages were apparently normal and no signs of thrombo-phlebitis in the pelvis could be detected. Pleurisy, pericarditis and some fine vegetations on the aortic valve were noted.

Infantile Cases.

Baby G. was born in the hospital on June 1. She weighed 3·15 kilograms (seven pounds) and the condition at birth was good. She was discharged apparently well on June 13. Nine days later the doctor was informed by the parents that a swelling of the vulva had been noticed by the mother before the child left the hospital. The matron denied this and the doctor had not seen the child stripped at this stage. On examination he found some induration round the vulva associated with inguinal adenitis. Since that date over forty abscesses have formed in various parts of the body. The bacteriological findings from these are referred to later. The child is still alive and slowly recovering.

Baby N., an illegitimate child, was born on June 8, following a normal labour. The weight was 3·4 kilograms (seven and a half pounds) and the general condition at birth good. She left the hospital on June 20 apparently healthy and was boarded out in another suburb and not seen again by her doctor. On July 8 the infant was admitted to the Children's Hospital with a history of illness for eight days commencing with a swelling of the right ankle. There was cellulitis of the thigh and œdema of both legs. Examination of the pus revealed a streptococcal infection. The baby died on July 23.

Baby M. was born on June 30, following a difficult forceps delivery and weighed 3·6 kilograms (eight pounds). On the ninth day an offensive discharge from the right ear was noted. It cleared up in a few days and the child was circumcised. When he left the hospital on July 20 there was a small unhealed stitch hole in the frænum. According to the parents the child became ill on July 22, but was not seen by the doctor until July 25. Induration of the right groin and abdominal distension were noted. Cultures from the indurated area were sterile. The baby died on July 28.

Babies G. and N. occupied the room which Mrs. V. had occupied. Baby M. was in a separate room. One doctor attended Mrs. V., another attended at the birth of Babies G. and M. and a third doctor confined the mother of Baby N.

Conditions at the Hospital.

Inspection of the hospital concerned revealed the following facts: It was a wooden building registered for general and obstetrical patients. Its capacity was ten beds, three of which were normally sufficient for obstetric patients. The staff consisted of two double certificated nurses, one obstetric nurse and a probationer. The matron had little to do with the patients. There was both a day and a night nurse on duty and the latter bathed the babies. The probationer attended the patients only when the day nurse was off duty. The average annual number of obstetric patients was seventy-two and all were attended by medical men. The rooms were clean. Usually one ward with three beds was used for obstetric patients unless a separate room was desired. At the time of inspection this room contained two patients, an obstetric patient recovering from a severe attack of pyelitis and a patient with pneumonia. This was said to be unusual and due to shortage of accommodation because of the insistence of the doctors that their patients should be admitted, even when the hospital was full. A small theatre was used as a labour ward. The routine technique after shaving the vulva and washing with soap and water, was to swab with biniodide of mercury solution. Vaginal examinations were made solely by the matron and then only if requested by the doctors. There was a small steriliser in the theatre for preparing dressings *et cetera*. Patients supplied cotton wool and gauze for pads which were placed in a pillow case and sterilized. The parcel was then stored in the theatre until required and accompanied the patient back to her room. There it was not kept in a special container, but stored in the patient's locker. Inspection of the charts which were well kept, revealed no fever

among patients over a considerable period. There had been no cases of illness nor obvious septic infection among the staff. The hospital had an excellent reputation among the medical men of the district.

The room occupied by Mrs. V. had been disinfected according to the rules of the Department of Health and the mattress destroyed. The cots and blankets used by the infants had been thoroughly disinfected and all the mattresses burned.

Summary of Clinical Facts.

1. Normal delivery on April 9 of a patient who became seriously ill on April 23 and died on June 4 in the Women's Hospital. The regulations regarding puerperal septicæmia had been properly carried out.

2. No further cases in this room until June 1 and 8 and with different doctors. Normal convalescence of mothers and babies. However, both babies developed septicæmia after discharge, one died and the other is still alive. A third infant born on June 30 lived in another room and died later from septic infection.

3. Inspection of the hospital and its methods did not reveal any gross defects in general management.

The Search for a Carrier.

The next step in the investigation was the search for a carrier of virulent streptococci among the five doctors and four nurses who were considered to be possible sources of infection. After exclusion of obvious foci, such as aural discharges, paronychia or open pustules, swabs were taken from the tonsillar fossæ and naso-pharynges of these nine persons. The culture from the naso-pharynx was obtained through the mouth, a swab being used similar to those designed for the examination of meningococcal carriers. This consisted of a curved steel wire carrying the swab enclosed in a sterile glass tube, four millimetres in diameter and twenty centimetres long, curved at an angle of 40° about 3·5 centimetres from one end. Both ends were plugged with cotton wool. The wire projected from the long limb of the tube and served as a handle. Contamination with mouth organisms was avoided by returning the swab into its tube before withdrawal from the naso-pharynx. Cultures were made on blood agar plates (5% citrated horse blood in hormone agar). After twenty hours' incubation at 37° C. the plates were examined, the different types of colony being noted and Gram-stained films of each made.

Further investigations were made in the case of colonies which produced hæmolysis or resembled in any way those isolated from Mrs. V. or Baby G. which are described below.

Referring to the doctors as "D" and the nurses as "N," the findings were briefly as follows:

D1. In the tonsillar swab colonies of green streptococci and diphtheroids predominated; probable pneumococci were also present and a few colonies of pin-point size with a hæmolytic halo which proved to be streptococcal. From the naso-pharynx a sparse growth of green streptococci and diphtheroids was obtained.

D2. From the tonsils, colonies of green and colourless streptococci and colonies of Gram-negative cocci (probably *Micrococcus catarrhalis*) were obtained in profusion and white staphylococcal colonies in smaller numbers. Similar organisms were present less abundantly in the naso-pharynx.

D3. From the tonsils a profuse growth of *Staphylococcus albus*, colourless streptococci and *Micrococcus pharyngis siccus* was obtained, while green streptococcal colonies of pin-point size were also found. In the culture from the naso-pharynx large Gram-negative cocci growing in semi-transparent colonies, from one to two millimetres in diameter (probably *Micrococcus catarrhalis*) were present in abundance, while colonies of *Micrococcus pharyngis sicus*, green streptococci and diphtheroids were less numerous.

D4. In the tonsillar cultures in a profuse growth, colonies of green streptococci and white staphylococci were predominant. Also present in small numbers were Gram-negative diplococci growing in small round colourless colonies and a few tiny hæmolytic colonies. The latter were thought to be streptococci, but only a few short Gram-negative organisms could be seen in the microscopical preparation and subcultures in blood agar and in glucose both failed to grow. From the naso-pharynx an almost pure culture of semi-transparent colourless colonies about one millimetre in diameter, of Gram-negative diplococci (probably *Micrococcus catarrhalis*) was obtained.

N1. The tonsillar culture grew chiefly white staphylococcal and tiny green streptococcal colonies, while large green and colourless streptococcal colonies and tiny transparent colonies of mixed Gram-positive and Gram-negative cocci were also present. In the naso-pharyngeal culture, white staphylococci, green streptococci and Gram-negative diplococci growing in small transparent colonies were found.

N2. Equally numerous and predominating were white staphylococci and streptococci, the colonies of which were surrounded by a clear hæmolytic zone about two millimetres in width and were small (none greater in diameter than 0·5 millimetre), dense and white. Two varieties of green streptococcus were also present. From the naso-pharynx the colonies grown in greatest numbers were those of *Micrococcus pharyngis siccus* and a green streptococcus. There were also a few white staphylococcal colonies and a few hæmolytic streptococcal colonies similar to though slightly larger than those in the tonsillar culture.

N3. The tonsillar culture yielded staphylococcal, probable pneumococcal and green streptococcal colonies, but from the naso-pharynx was obtained a pure culture of large (one to two millimetres) round, moist, flat, semi-transparent colonies. In twenty-four hours the hæmolysis caused by these was underlying and only slightly extending beyond the colony, but it became much wider after forty-eight hours. Films showed round Gram-positive cocci occurring chiefly in chains of six to twenty organisms. The very close resemblance of these colonies to those obtained from Mrs. V. and Baby G. was noted and will be referred to again below.

N4. The culture from the tonsils revealed white staphylococci, green streptococci and a few tiny clear colonies of Gram-positive and Gram-negative rods and a few larger, flatter colonies with pale green halo, of faintly Gram-positive and Gram-negative rods. From the naso-pharynx a thick growth of white staphylococci and a few colonies of green streptococci were obtained.

Bacteriological Examination of Pathological Material.

Through the courtesy of Dr. C. H. Mollison one of us (L.M.B.) has been able to examine bacteriologically many of the blood cultures taken from patients suffering from puerperal sepsis at the Women's Hospital. One of these was a culture taken on July 2, 1927, from Mrs. V., the patient referred to above. In subculture on blood agar there was after twenty-four hours a pure culture of hæmolytic

colonies notably much larger than any colonies of streptococci obtained in previous cultures from cases of puerperal sepsis. Individual colonies were round, one to two millimetres in diameter with regular margins which were very thin. The colonies were almost flat, but slightly thicker in the centre, semi-transparent and smooth, with a very moist glistening appearance. Where the growth was thicker, the colonies coalesced to form a moist, flat growth spreading over the medium. On removal of a portion of the colony with a platinum needle, the impression was gained that they were of an extremely fluid consistency and not mucoid in character. In forty-eight hours the colonies on blood agar had become larger, some exceeding three millimetres in diameter and had dried considerably. The smooth glistening appearance gave place to a granular one, they tended to become mamillated in the centre and to curl up from the medium at the edges. The area of hæmolysis in twenty-four hours was narrow compared to the size of the colony, extending only for about 0·5 millimetre around it, but in forty-eight it was much wider and more complete.

In glucose broth a slightly turbid growth with some large loose floccules was obtained. Microscopical examination of this revealed rather large (about 1 μ in diameter) round Gram-positive cocci occurring occasionally in pairs, but usually in chains of six to twenty organisms. No capsule was demonstrated. A saline solution suspension of organisms from glucose broth culture was not bile-soluble, glucose broth cultures produced complete hæmolysis of washed red cells after incubation at 37° C. for one hour. Lactose, mannite, salicin, raffinose and inulin broths were inoculated; of these, salicin alone was fermented and in the first instance only after forty-eight hours, but in later inoculations the salicin broth always became strongly acid within twenty-four hours. This organism after isolation in May, 1927, was kept alive on a blood agar slope at 0° C..

In August, 1927, a specimen of pus obtained by aspiration from a subcutaneous abscess in the thigh of Baby G. referred to above, was submitted for examination. From this an organism identical in all respects with that obtained from Mrs. V. was isolated in pure culture. The organism obtained from the naso-pharyngeal swab of Nurse 3, both at the first and at a second examination nine days later, was also identical in its cultural and morphological characters with the two former strains of streptococci. The nurse was accordingly regarded as a carrier and examined by Mr. G. C. Scantlebury and Dr. K. S. Cross who found that she had a purulent collection in her left maxillary antrum which the former evacuated.

This pus was found to contain the same organism in pure culture. In smears the cocci were round, occurring singly, in pairs and in chains, some of which consisted of more than twenty organisms. Some of the diplococci and shorter chains appeared to have a small capsule. This is the only occasion on which a capsule could be demonstrated with this organism. Many pus cells, but no active phagocytes were seen.

As the colonies described above somewhat resemble those of the *Streptococcus mucosus*, often considered to be a type of pneumococcus, emulsions from the strains from Mrs. V., Baby G. and Nurse 3 were tested with anti-pneumococcal serum, but no agglutination occurred. Their serological relationships with other streptococci have not yet been determined.

The pathogenicity of these strains to mice between three and four months old was also investigated. It was found that 0·5 cubic centimetre of a glucose broth culture five hours old given intraperitoneally, caused acute peritonitis and septicæmia within twenty-four hours and death within seventy-two hours; if the same dose of an eighteen hours glucose broth culture was given, death with acute peritonitis and septicæmia always occurred within twenty-four hours.

These results are briefly recorded in Table I.

TABLE I.
RESULTS OF MOUSE INOCULATIONS.

No.	Type and Source of Strain.	MOUSE 1. Examined twenty-four hours after inoculation.	MOUSE 2. Examined if inoculation caused death.
1	Hæmolytic streptococcus. Pure culture from blood of Mrs. V. (78 I).	Five hours culture given. Appearance: ill. *Post mortem* findings: peritonitis; very few cells seen. Organisms very numerous; culture: streptococci grown. Septicæmia.	Five hours culture given. Dead within seventy-two hours. *Post mortem* findings: peritonitis; cells numerous but not very active. Free organisms few; culture: streptococci grown. Septicæmia.
2	Same strain as No. 1. (78 II).	Eighteen hours culture given. Dead within twenty-four hours. *Post mortem* findings: peritonitis; cells very few and degenerated. Free organisms very numerous; culture: streptococci grown. Septicæmia.	One mouse only inoculated.
3	Hæmolytic streptococcus Pure culture from pus of Baby G. (I)	Five hours culture given. Appearance: lively. *Post mortem* findings: abscess at site of inoculation containing living streptococci. No peritonitis. Cultures from peritoneum and heart blood sterile.	Five hours culture given. Dead within forty-eight hours. *Post mortem* findings: peritonitis; no cells seen; organisms very numerous; culture: streptococci grown. Septicæmia.
4	Same strain as No. 3. Baby G. (II)	Eighteen hours culture. Dead within twenty-four hours. *Post mortem* findings: peritonitis; no cells seen; organisms numerous but many degenerating; culture: streptococci grown. Septicæmia.	Only one mouse inoculated.
5	Hæmolytic streptococcus. Pure culture from naso-pharynx of N. 3. (N3. NP 1.I)	Five hours culture given. Appearance: ill. *Post mortem* findings: peritonitis; very few cells; organisms numerous; culture: streptococci grown. Septicæmia.	Five hours culture given. Dead within forty-eight hours. *Post mortem* findings: peritonitis; no cells seen; organisms numerous; culture: streptococci grown. Septicæmia.

TABLE I (*continued*).

RESULTS OF MOUSE INOCULATIONS.

No.	Type and Source of Strain.	MOUSE 1. Examined twenty-four after inoculation.	MOUSE 2. Examined if inoculation caused death.
6	Same strain as No. 5. (N 3. NPI. II).	Eighteen hour culture given Dead within twenty-four hours. *Post mortem* findings: peritonitis; very few cells; organisms numerous; culture: streptococci grown.	Eighteen hour culture given. Dead within twenty-four hours. *Post mortem* findings: peritonitis; very few cells; organisms numerous; culture: streptococci grown. Septicæmia.
7	Hæmolytic streptococcus. Pure culture from naso-pharynx of N3. (second examination) (N3. NP 2).	Eighteen hour culture given. Dead within twenty-four hours. *Post mortem* findings: peritonitis; cellular *debris*; organisms numerous; culture: streptococci grown. Septicæmia.	One mouse only inoculated.
8	Hæmolytic streptococcus. Pure culture from left maxillary antrum of N3. (N3 LM A).	Eighteen hour culture given Dead within twenty-four hours. *Post mortem* findings: peritonitis; culture: streptococci grown. Septicæmia.	One mouse only inoculated.

Table II gives the results of the fermentation tests with the original strains from these sources and of those with the organisms recovered from the mice. For these tests peptone water was used to which was added 1% of "sugar," 10% of serum and 1% of Andrade's indicator. The substances tested were lactose, mannite, salicin, raffinose and inulin. Readings were taken for eight days after inoculation. The chief facts which emerge are that there is a general agreement between the fermentative action of the original strain with that recovered from the corresponding mouse and that where differences are noted, they are always in the direction of increased activity on the part of the organism from the animal. Thus the characteristic action of the streptococci isolated from Mrs. V., Baby G. and Nurse 3 has been strong development of acid from salicin (producing deep pink colour and opalescence probably due to coagulation of serum) within twenty-four hours and a slighter fermentation of lactose, occurring between the fifth and eighth days (producing only a pale pink colour with no opalescence), whereas in the cultures from the corresponding mice, the fermentation of lactose occurred usually between the third and the fifth day and was sometimes as pronounced as that of salicin.

The streptococci recovered from the mice were similar morphologically and culturally to those inoculated. These investigations and a third examination in November, 1927, gave opportunity for confirmation of the constancy of the characteristics described above.

General Discussion.

The question arises as to how long the nurse had harboured the organism. She had been in constant contact with obstetric patients and babies in the same hospital for four months, during which time no septic infections occurred, prior to the illness of Mrs. V. A possibility is that both were infected from a common source, the result being fatal illness in the non-resistent puerperal woman and only chronic localized disease in the nurse in normal health.

Since streptococci pathogenic for man are sometimes found in milk and in view of the fact that a streptococcus, tentatively named *Streptococcus epidemicus* (Davis), which resembles the above strains in many respects, has been described[1] in connexion with an epidemic of illness in Boston attributed to contaminated milk, it was decided to examine a sample of that used in the hospital. Using a technique kindly described by Mr. G. McLennan, B.V.Sc., of the Melbourne University Veterinary School, no streptococci resembling the above strains were found. Mr. McLennan also reported that the dairy supplying the hospital had a good reputation in regard to the bacterial content of the milk.

Against the theory of recent infection of the nurse is the doubt whether such a collection of pus as that found in her left antrum could be formed in the chronic manner indicated by the lack of history of acute onset and absence of symptoms, in the two months interval between the first and second outbreaks.

The mode of infection of Mrs. V. is doubtful. There was no *post mortem* evidence, nor were there during her illness definite signs or symptoms of pelvic disease and unfortunately no intrauterine or cervical cultures were taken. It is possible that the organisms gained entry by a pelvic portal and that, as in many septicæmias of rapid development, there was very little local reaction. On the other hand, the onset so late in the puerperium suggests an extrapelvic origin.

The most important point, however, is that there can be very little doubt that infection was transmitted, probably to Mrs. V. and almost certainly to the babies, from a naso-pharyngeal focus in the attendant. In the routine nursing attention given to infants and possibly to a woman in the late puerperium, strict aseptic precautions would probably not be considered necessary. These cases point to the need of very careful cleansing of hands and avoidance of breathing contact with the patients during such ministrations. The nurse did state that she occasionally suffered from "slight colds." There would at such times be an increased risk, through coughing and sneezing, of transference of infection either by fingers or by droplet infection.

The relationships of the streptococcus isolated from Mrs. V., Baby G. and Nurse 3 present a point of academic interest. In Holman's[2] grouping it would seem to be intermediate between *Streptococcus equi* and *Streptococcus pyogenes*. Morphologically it resembles most closely the *Streptococcus mucosus*. The statement is often seen that the organism originally described under this name is now regarded as a type of pneumococcus, forming Group III in the Rockefeller Institute serological

classification. Apart from specific agglutinability, it is generally agreed that fermentation of inulin, encapsulation and bile solubility are the most important criteria of pneumococci and hæmolysis is rarely caused by this group. Although the Pasteur Institute workers[3] state that any of these three positive features may be absent, an organism which possesses none of them and which is definitely hæmolytic, cannot be regarded as a pneumococcus. In the Rockefeller Institute Monograph,[4] however, it is suggested that there has been considerable confusion in the literature between the *Pneumococcus mucosus* which, apart from the distinctive colonies, possesses all the typical characteristics of pneumococci and is highly pathogenic to mice and a second organism *Streptococcus mucosus*. This is encapsulated, but does not ferment inulin or dissolve in bile, is less virulent for mice and more hæmolytic than the pneumococcus.

The organism under consideration in this paper differs from the *Streptococcus mucosus* as described by the Rockefeller Institute workers in three respects:

1. The colonies are flat and watery, rather than heaped up and mucoid.
2. Encapsulation has not been a prominent feature.
3. Pathogenicity to mice was considerable.

In the size and confluence of colonies, however, and the slow production of moderate hæmolysis, it resembles the *Streptococcus mucosus*. As these latter features have been made use of in identifying the three strains of this organism and in distinguishing it from other more classical types of pyogenic streptococci, it is perhaps better to leave out of consideration the various other standpoints from which the classification of streptococci is still being approached, at the present time and to regard it on morphological grounds as a somewhat atypical form of *Streptococcus mucosus*.

Summary.

1. Four cases of serious septic disease, one in a puerperal woman, the others in new-born infants, occurred within three months in a private hospital.
2. Streptococci presenting similar, but unusual features were isolated from the woman and one

TABLE II.—COMPARISON OF FERMENTATION TESTS.

Strain.	Reading on Day.	Sugar Reactions with Original Stain.[1]					Sugar Reactions with Corresponding Mouse Strain.[1]					
		Lactose.	Mannite.	Salicin.	Raffinose.	Inulin.	Lactose.	Mannite.	Salicin.	Raffinose.	Inulin.	Source of Mouse Strain.
Mrs. V. (78 I)	2	O	O	A	O	O						
	5	O	O	A	O	O						
	8	a	O	A	O	O						
Mrs. V. (78 II.)	2	O	O	A	O	O	O	O	A	O	O	P
	5	a	O	A	O	O	a	O	A	O	O	P
	8	a	O	A	O	O	O	O	A	O	O	HB
Baby G. (I.)	2	O	O	A	O	O						
	5	O	O	A	O	O						
	8	a	O	A	O	O						
Baby G. (II.)	2	O	O	A	O	O	O	O	A	O	O	P
	5	O	O	A	O	O	a	O	A	O	O	P
	8	a	O	A	O	O	a	O	A	O	O	HB
N3. NP 1 (I.)	2	O	O	A	O	O						
	5	O	O	A	O	O						
	8	a	O	A	O	O						
N3. NP 1 (II.)	2	O	O	A	O	O	a	O	A	O	O	P
	5	O	O	A	O	O	A	O	A	O	O	P
	8	a	O	A	O	O	A	O	A	O	O	HB
N3. NP 2 ...	2	O	O	A	O	O	O	O	A	O	O	P
	5	a	O	A	O	O	a	O	A	O	O	P
	8	a	O	A	O	O	O	O	A	O	O	HB
N3. L.M.A.	2	O	O	A	O	O	O	O	A	O	O	P
	5	a	O	A	O	O	a	O	A	O	O	P
	8	a	O	A	O	O	O	O	A	O	O	HB

[1] A = acid, a = slight acid, P = peritoneum, HB = heart blood.

baby, the others not being available for examination.

3. Bacteriological examination of the throats and naso-pharynges of five medical men and four nurses who had been connected with the patients, revealed the presence of an identical organism in the naso-pharynx of one nurse.

4. Disinfection of the room occupied by the first patient failed to prevent the second outbreak, less than three months later. The nurse referred to above refrained from duty, as advised by the Director of Obstetrical Research, pending further examination and treatment. No further cases have occurred to date.

5. The unusual features presented in common by the streptococci isolated from the three sources mentioned above are described in the text. The relationships of the organisms are considered.

6. Tabulated reports are given of the results of intraperitoneal inoculation of mice with these strains and of their fermentative activity.

Acknowledgments.

Our thanks are due to Dr. C. H. Kellaway, Director of the Walter and Eliza Hall Institute, for extending laboratory facilities and for much help and criticism during this investigation. We also appreciated fully the willing and helpful cooperation of the medical men, matron and nursing staff of the hospital concerned, without which it would have been impossible to carry out this work and of those specialists whose advice was sought in the later stages. We desire to thank also the honorary and resident medical staff of the Women's Hospital for allowing us to make use of the hospital records and Dr. C. H. Mollison, Pathologist to the Women's Hospital, for his unfailing interest and help in the bacteriological work undertaken for the Obstetrical Research Committee.

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THE MANAGEMENT OF SYPHILIS.[1]

By GLEN H. BURNELL, B.S., M.D. (Adelaide),

Surgeon to Male Night Clinic, Adelaide Hospital; Honorary Surgeon to Out-patients, Adelaide Children's Hospital.

I AM glad of the opportunity to speak tonight on the subject of the management of syphilis, because experience at the Night Clinic shows that there has been a recent marked increase in the incidence of this disease. I have seen more primary chancres during the past six months than I have seen in any other two years.

The most important *desideratum* in the management of syphilis is to start treatment early. I teach the students that every patient with secondary syphilis is a potential tabetic and when one realizes that the meninges are invaded early in the secondary stage, it becomes evident that the diagnosis of the primary lesion is a matter of extreme importance. I therefore offer no apology for discussing the question of diagnosis at some length.

As there is a peculiar rarity of *ulcus molle* in Adelaide, the students are taught that every genital sore, excepting those of herpes and of scabies, is to be regarded as a primary chancre until proved otherwise; even in the case of these other two diseases, it must be borne in mind that they may become secondarily infected with the spirochæte, giving rise to multiple primary chancres.

You know that the typical Hunterian chancre is a single abraded area, painless or almost so, with a regular outline, being oval or circular, raised above the surrounding tissues with a smooth base and shelving edge and surrounded by an area of induration. The lymphatic glands in its area of drainage are frequently enlarged, discrete, painless, unless secondarily infected and of the consistency of India-rubber.

But what is not so well known is the fact that approximately 50% of chancres depart considerably from this description. For instance, induration is frequently absent, notably in lesions of the *glans penis*, the structure of which does not permit of the cellular reaction necessary for the occurrence of induration. Indeed, in most extragenital chancres, excepting those of the lip, induration is not a pronounced feature, but their diagnosis is suggested by the rapid and definite enlargement of the associated lymphatic glands.

Again, while the typical chancre is single, in 25% of cases multiple lesions appear.

You may say, if then the primary lesion varies so much, how is it to be recognized? While it is true that their characteristics vary considerably, still all chancres conform to one of three main types:

1. Papulo-erosive. This is the typical Hunterian chancre as described above.

2. Granulating chancre. This has a red granulating base, very little surrounding induration and tends to appear on the shaft of the penis or on the scrotum. While there is little induration there may be considerable non-inflammatory œdema.

3. Papulo-ulcerative. These usually occur under the prepuce and frequently ulcerate through the frenum. As in these cases there is a good deal of secondary infection, they tend to be slightly more painful than the others, but not so much so as *ulcus molle*, nor are their edges undermined, as in the case of the soft sore. Doctors Gibson and Wiley, of the Royal Prince Alfred Hospital, Sydney, for whose opinions I have the highest regard, have

[1] Read at a meeting of the South Australian Branch of the British Medical Association on February 23, 1928.

described[1] seven types of genital chancres, but they may be considered subdivisions of the above three main types.

What help can we receive from the laboratory in the diagnosis of a primary chancre? The specific organism should in theory be demonstrable in 100% of these cases, but in actual practice this is far from being the case and in only 60% to 70% of patients can it be so discovered. While, therefore, its presence renders the diagnosis certain, inability to discover it should not influence one in the slightest against making a diagnosis of syphilis. When a scraping of an ulcer does not contain *Spirochæta pallidum*, these organisms can frequently be discovered by aspirating one of the enlarged lymphatic glands. Again, the Wassermann test is of very little value, as it does not yield a reaction until at least two weeks after the appearance of the sore and indeed usually takes longer. It will be evident then that the clinical examination is of paramount importance in making the diagnosis and had I to choose between clinical and laboratory methods I should unhesitatingly choose the former. Before leaving the question of diagnosis, I would like to mention those patients who come for examination with a purulent discharge issuing from a tight foreskin which cannot be retracted. I would urge on you not to treat them as straightforward cases of gonorrhœa, even when the presence of the gonococcus is demonstrated. I have seen too many such patients who were suffering from a chancre of the preputial sac with an associated balanitis or from a meatal chancre. These latter are usually indurated, but the induration is not evident when the penis is palpated from side to side, while it is quite pronounced on palpating from above downwards.

To sum up: Rely for the diagnosis on your clinical examination, confirming it when possible by laboratory methods and remembering also that in Adelaide at any rate *ulcus molle* is almost unknown.

Prognosis.

With the discovery of the arseno-benzene group of drugs by Ehrlich it was thought that the long looked for certain cure for syphilis was in sight and indeed it was at first believed that one injection might achieve this object. Experience, however, soon showed that this was not the case and since then we have steadily receded from that position, so that the tendency at present is to give more and more treatment. I must confess to a feeling of some pessimism with regard to the ultimate and permanent cure of syphilis once it has become generalized, even though the patient may have given no response to the Wassermann test for three years after the cessation of treatment. Syphilologists are not agreed among themselves as to the amount of treatment necessary in secondary and tertiary cases, so that I cannot lay down hard and fast rules to guide you.

When should a patient who has had syphilis be allowed to marry? (I refer here only to males, as Dr. Matters will deal with the question of female syphilitics.) It seems to me this question must be considered from two aspects: (i) What is the risk to wife and offspring? (ii) What is the risk of the patient himself developing a lesion, such as an aneurysm, which may permanently incapacitate him as a breadwinner?

It must also be borne in mind that if restrictions on marriage be made too rigid, the patient may ignore them altogether, thus depriving us of the opportunity of affording any protection at all to his future wife. The middle course which I have chosen is to allow a patient who has had reasonable treatment to marry three years after cessation of treatment, provided that his blood test taken at frequent intervals throughout that period, has persistently yielded no reaction.

With regard to the man with persistent positive Wassermann result, but no detectable clinical evidence, I have allowed some such to marry with the advice that his wife be treated throughout each pregnancy. It is also advisable to have the blood of the wives of all such patients tested one and two years after marriage. May I here digress for a moment to impress on you what a fatal mistake it is to discharge a patient after one failure to give a response to the Wassermann test. This warning may appear unnecessary to you, but I still see patients in whom the neglect of this advice has led to disaster.

With regard to the risk of the patient being incapacitated later in life, I think that once this risk has been explained to him, we may leave it to him to decide whether he is willing to take it. For my part I consider only the question of infectivity. I have mentioned blood tests repeatedly, but have omitted the Wassermann test of the cerebro-spinal fluid. It goes without saying that this in secondary and tertiary patients should persistently fail to yield a reaction before discharge. Unfortunately at the Adelaide Hospital no beds are available for officers of the venereal clinic, so I have had to omit this test, but I would urge you to do it whenever possible and always at least twice.

The Routine Treatment of Syphilis.

You will forgive me if I appear dogmatic in regard to the routine treatment of syphilis, but time forbids the discussion of alternative methods and I have tried to outline the average course of treatment for various classes of patients.

The drugs used are the arsenobenzols such as "Salvarsan" and "Neosalvarsan," with their derivatives, "Silver-Salvarsan" and "Sulfarsenol." They may be given intravenously and the last intramuscularly. Bismuth is used in either the metallic form in glucose suspensions or as the hydroxide of bismuth; these are given intramuscularly.

Mercury is given by mouth, by inunction, intravenously or intramuscularly. Potassium iodide or one of the colloidal iodine preparations may be used. Bismuth appears to be considerably more efficacious than mercury and has largely replaced

the latter in routine treatments at venereal disease clinics.

The various classes of patients are treated as follows:

1. Primary chancre: When there is a failure to respond to the Wassermann test at onset of treatment, ten injections of one of the arsenobenzols are given at intervals of five to seven days. With each such injection one of bismuth is given. The patient then has a rest for six weeks from injections, during which he takes potassium iodide; the same course is then given over again. After rest for six weeks, blood tests are commenced and they should be continued for three years.

2. Primary chancre: When the response to the Wassermann test is positive at the commencement of treatment, the same routine as above is adopted. The patient has rest for two months from treatment. Then give potassium iodide for one month. Then give six injections each of arsenobenzol and bismuth or mercury. Proceed with blood tests as before.

3. Secondary syphilis: The whole of treatment under heading two is given. The patient rests for three months. Potassium iodide is given for one month. Then six injections each of arsenobenzol and of bismuth or mercury are given. Proceed with blood tests as before.

4. Patients with tertiary or latent syphilis: The whole of treatment under number three is given. Then the patient rests for four months, then one month's potassium iodide treatment is given. Give six injections each of arsenobenzol and of bismuth or mercury. Rest four months, then give one month's potassium iodide treatment. Repeat the injections mentioned above, six of each. Commence blood tests as before.

In this group of patients it will be found that many continue to give a Wassermann reaction in spite of treatment. In such a case it is well to bear in mind that you are treating a human being and not a Wassermann reaction and you must be careful in using such powerful drugs over long periods of time without giving the patient adequate rest periods between courses.

The above routine is adapted from that of Colonel Harrison at Saint Thomas's Hospital.

The Malaria Treatment of General Paralysis.

The system of malaria treatment of general paralysis was introduced by von Jauregg in September, 1919. It had been known for many years that any febrile attack occurring in a general paralytic tended to cause a remission of his previous symptoms and attempts were made to bring about febrile attacks by producing fixation abscesses and later by the injection of such substances as milk, albumin, tuberculin and various vaccines. Finally a series of febrile attacks was produced by inoculating the paralytic with the parasite of benign tertian malaria. Such inoculations may be carried out either by the use of mosquitoes or more conveniently by the inoculation of the blood of a malaria patient. After eight to twelve rigors have occurred, the paralytic is treated for his malaria with quinine and this induced malaria usually responds rapidly to treatment. The results of this treatment are in advance of those of any other known method, some 50% to 75% of patients so treated responding favourably, but it is yet too early to judge the ultimate results. Naturally this method cannot be applied to debilitated patients.

Treatment of Toxic Symptoms Arising from Arsenobenzol.

If suitable precautions are taken, there will be very few complications calling for serious consideration. It is essential that the patient be examined to exclude gross disease of the heart and kidneys. It is also important that freshly distilled water be used and that the remedy be injected slowly. The patient should rest for a short time before and after injection.

The commoner toxic effects are as follows:

Vaso-motor disturbances (the so-called nitritoid crises) may come on shortly after injection or may be delayed a few hours. There is a flushing of the skin, sweating, rise in the pulse rate and fall of blood pressure.

Vomiting and rigors also occur. These symptoms can be relieved by the intramuscular injection of one cubic centimetre of adrenalin chloride solution. They may be prevented in later injections by giving the adrenalin five to ten minutes prior to the arsenical injection.

Later in the course of treatment various affections of the skin are seen. These may be either in the form of a simple erythema or may resemble the rash of scarlatina or measles, while if treatment be persisted in, in spite of the warning erythema, the patient may develope an acute exfoliative dermatitis.

Perhaps the commonest toxic symptom which we see at the clinic is jaundice. It is usually preceded by malaise and nausea and an examination of the urine at this stage will reveal the presence of bile. Both the skin affections and the jaundice are treated by stopping the arsenical treatment, giving large amounts of liquid carbohydrate food and reducing the supply of proteins and fats. Sodium thiosulphate in doses of 0·6 to 0·9 gramme is given intravenously as often as may be necessary, even twice daily in very severe cases and is certainly dramatic in its action on all forms of arsenobenzol intoxications.

The only toxic effects of bismuth which we see are stomatitis, diarrhœa and rarely albuminuria. The stomatitis is frequently accompanied by a blue line on the gum margins and with fairly excessive salivation. These symptoms are also amenable to treatment with sodium thiosulphate.

Peripheral neuritis has been ascribed to bismuth, but I have not seen such an occurrence.

Note on the Treatment of Syphilitic Affections of the Eye.

I would sound a note of warning in the treatment of eye affections. The dosage should be very small at first and only after its safety has been demon-

strated, should vigorous treatment be pursued, as there is the danger of a Herxheimer reaction occurring, which reaction may cause permanent damage to the eye even though the specific affection be eradicated.

The same warning applies to lesions of the brain itself and of the auditory nerve.

Conclusion.

In conclusion, I am aware that there are large gaps in the description of this protean disease, but I have attempted to describe the treatment of cases as they present themselves at the Night Clinic. While I am becoming each year more cautious in my prognosis of the outcome of any given case of syphilis, I am convinced that further progress lies in earlier diagnosis and treatment and this rests very largely with the general practitioner.

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SYPHILIS IN WOMEN AND CHILDREN.[1]

By REX F. MATTERS, M.B. B.S., F.R.C.S. (Edinburgh),
Surgeon to Female Night Clinic, Adelaide Hospital; Honorary Assistant Obstetrician, Queen's Home, Adelaide.

A COMBINED discussion on the diagnosis and treatment of syphilis should provide much instruction for us all and for my part I regret that as I was away and not aware of my share to the contribution until this week, my information may be rather haphazard.

Dr. Burnell will have dealt at length on the diagnosis of syphilis and also of its treatment in men. It is my intention briefly to mention diagnosis of syphilis peculiar to women. My statements refer mainly to the Night Clinic.

A primary chancre occurs in every woman who acquires syphilis, but unless the husband or consort is certain of his condition and as a result the woman becomes a patient at the Night Clinic, the chancres are rarely seen.

The place where these lesions are most frequently found is on the cervix and more rarely on the labia or thighs. On two occasions extragenital chancres were seen on the lips.

Another condition deserving consideration is that of repeated miscarriages. Usually the history is of the first abortion quite early in gestation and the succeeding abortions occur later and later until possibly a child is born which usually begins life with snuffles.

It is our duty to ascertain early the cause of these abortions and a Wassermann test should be made in every case in which two abortions have occurred without any obvious cause.

Cases do occur in which women fail to yield a reaction to the Wassermann test and have no symptoms, but there may be a history of miscarriages or sickly children. M. Rorke enumerates patients of this type who after the menopause have manifested gummata and other syphilitic lesions.

Marriage.

No woman is regarded as cured or marriageable until she has persistently failed to yield a reaction to the Wassermann test for two years and then is told that should she conceive she must return for further prophylactic treatment. Further it should be our aim to have a Wassermann test done on the cerebro-spinal fluid. Students are taught this, but as the accommodation in the clinic does not permit of this, it is not demonstrated to them there.

Treatment for Women.

At the Night Clinic arsenical preparations are held to be of the most importance and these are backed by bismuth which is considered of next importance. Mercury and iodides do not retain the same place in treatment as they did previously. The preparations used are:

1. Arsenical compounds. (i) "Novarsenobillon" given intravenously, (ii) "Sulfarsenol" administered intramuscularly, (iii) subsalves given *per rectum*.

In reference to the last named it might be mentioned that Ehrlich demonstrated that the arsenobenzol group directly applied to the spirochætes were not very toxic, but when liver substance was added, the organisms were destroyed. If, then, a member of the arsenic compound group be absorbed from the bowel by the portal vessels, it reaches the liver where it becomes lethal to the spirochæte. This theory is sound, but the practice is not adhered to, because the amount absorbed cannot be estimated and the uncertainty is unscientific.

2. Bismuth given intramuscularly.

3. Mercury administered orally by inunction or intramuscularly.

4. Iodides administered orally or subcutaneously.

Treatment is usually commenced by giving "Novarsenobillon" every week as shown in Table I. At the same time Hutchinson's pills are given two or three times daily. This course lasts for ten weeks. The arsenical compounds and bismuth may be given at the same time. After the "Novarsenobillon" course bismuth is given twice a week in

TABLE I.—SHOWING DETAILS OF A FIRST COURSE OF "NOVARSENOBILLON."[1]

Time.	Dose of "Novarsenobillon."
First week	0·3 gramme
Second week	0·3 gramme
Third week	0·3 gramme
Fourth week	0·45 gramme
Fifth week	0·45 gramme
Sixth week	0·45 gramme
Seventh Week	0·6 gramme
Eighth week	0·6 gramme
Ninth week	0·6 gramme
Tenth week	0·6 gramme

[1] Pil. Hutchinson is given twice a day during these injections.

[1] Read at a meeting of the South Australian Branch of the British Medical Association on February 23, 1928.

doses of 0·2 to 0·4 gramme for eight weeks, provided there are no toxic symptoms. In Table II details of a course of bismuth are set out. Following this iodides are given for four weeks when a Wassermann test is made and at the same time the patient returns to the "Novarsenobillon" course.

TABLE II.—SHOWING DETAILS OF A COURSE OF BISMUTH.[1]

Time.		Dose of "Bicreol."
First week	Tuesday	1·0 cubic centimetre
	Thursday	1·0 cubic centimetre
Second week	Tuesday	1·5 cubic centimetres
	Thursday	1·0 cubic centimetre
Third week	Tuesday	1·5 cubic centimetres
	Thursday	1·0 cubic centimetre
Fourth week	Tuesday	1·5 cubic centimetres
	Thursday	1·0 cubic centimetre
Fifth week	Tuesday	1·5 cubic centimetres
	Thursday	1·5 cubic centimetres
Sixth week	Tuesday	1·5 cubic centimetres
	Thursday	1·5 cubic centimetres
Seventh week	Tuesday	2 cubic centimetres
	Thursday	1·5 cubic centimetres
Eighth week	Tuesday	2 cubic centimetres
	Thursday	2 cubic centimetres

[1] One cubic centimetre of "Bicreol" = 0·15 gramme of mercury.

Wagner von Jauregg introduced the pyrexial treatment of neuro-syphilis and subsequently used malarial treatment.

Since then Plaut, of Munich, has introduced the *Spirochæta* or *Spirosoma duttoni* of the African relapsing fever for treatment of neuro-syphilis. This appears to have a definite action in the cerebro-spinal cavity. The material is taken from an infected mouse and injected into the patient after first being mixed with saline solution.

Plaut found that the spirochætes of relapsing fever could be found in the spinal fluid during the second chill and that inflammatory symptoms subsequently set in. Gradually the latter die down, but the germs can be found in the fluid after two or three months, disappearing only after the inflammatory symptoms have long passed away. These spirochætes disappear from the blood at a much earlier date.

The intervals between the peaks of relapsing fever are longer than those of malaria and so are less exhausting. Plaut considers that there are very few contraindications to this treatment and that even rather debilitated patients can be treated by this means without incurring great risk.

Neither malarial nor relapsing fever treatment can be given at the Night Clinic, however, owing to the fact that no beds are available for this department.

Syphilis in Children.

Syphilis in children is usually congenital, but may be acquired. The discovery may be due to some obvious syphilitic lesion or accidental in the routine blood examination of members of a family one of whom has syphilis.

The diagnosis may be suggested by snuffles, interstitial keratitis, rash, enlarged spleen, epiphysitis or previous miscarriage of the mother.

In infants blood may be obtained from the anterior fontanelle or by stabbing the heel with a tenatone, provided no other fluid remains on the heel to lake the blood.

Treatment of syphilis in infants or children depends on the accessibility of veins. Usually, however, all treatment is given by the intramuscular route and "Sulfarsenol" may be injected in doses varying from one to six centigrammes. Bismuth is given as "Bismuthyl" or the oily suspension as "Muthanol."

It is thought that a recent preparation introduced by Levaditi and marketed as "Bistoval" which contains both bismuth and arsenic is very suitable for children. Mercury may be given as *hydrargyrum cum creta* 0·03 to 0·06 gramme (one-half to one grain) three times a day by mouth or by inunction.

Conclusion.

In concluding these remarks may I add, it is suggested that excessive caution must be observed and that it is wiser to err on the side of too much rather than too little treatment when endeavouring to eliminate syphilis, but one must remember that it is the human being who is being treated and not the response to the Wassermann test which serves merely as an indicator in the progress of the treatment of syphilis.

SYPHILITIC LESIONS AS MET WITH AT POST MORTEM EXAMINATIONS.[1]

By J. BURTON CLELAND, M.D. (Sydney),

Professor of Pathology, University of Adelaide; Honorary Pathologist, Adelaide Hospital.

FROM the beginning of 1920 to the end of 1927 1,600 *post mortem* examinations have been carried out at the Adelaide Hospital. The majority have been done by myself and the balance have been reviewed by me and specimens of importance have been examined.

The lesions met with at these autopsies have now all been tabulated under various headings. It is thus easy to ascertain the number of cases in which syphilitic lesions were found, if we can be certain as to what types of lesions may be considered characteristic of syphilis. Nearly, but not quite all aneurysms of the aorta are unquestionably of syphilitic origin. In these cases syphilitic aortitis is nearly always obvious also in other parts of the aorta. Typical syphilitic aortitis can be fairly readily differentiated by the naked eye from senile atheroma by the tendency to longitudinal

[1] Read at a meeting of the South Australian Branch of the British Medical Association on February 23, 1928.

and triradiate scarring when viewed from the inside and by a general thickening of the wall which extends to the periaortic tissues. Sometimes it is necessary to make a microscopical examination to be certain, when round-celled and plasma-celled infiltration can be considered as characteristic of a syphilitic condition. Syphilitic disease of the aortic cusps is, we believe, always associated with a syphilitic aortitis. Gummata occurring in the brain or meninges may suggest their nature by adhesions between the membranes and the brain or by erosion into the cranial bones. Nevertheless microscopical examination will be frequently required to distinguish between gummata and gliomata. General paralysis of the insane usually gives a fairly clear clinical picture. Our experience in *post mortem* examinations on these patients is that the lesions met with in South Australia are rarely very prominent and in a number of our cases might have been easily overlooked, had not the history been available as a guide. In these cases there has often been merely a little thickening of the *pia mater*, with perhaps indefinite adhesions to the cortex, some excess of cerebro-spinal fluid and some granularity of the floor of the fourth ventricle. Except in the case of a boy, aged ten, with congenital syphilis and general paralysis of the insane, we have not met with advanced wasting of the convolutions. Locomotor ataxy will be suggested by the history and confirmed by examination of the cord. Gummata in and syphilitic cirrhosis of the liver are usually recognizable as such, in the case of the latter the scarring being very irregular and the deformity great. Perforating ulcers of the toe or of the palate, Charcot's disease and syphilitic disease of the bones of the skull are also fairly characteristic. Other lesions are much more indefinite. It is possible that some forms of fibrosis of the lungs, loosely called interstitial pneumonia, may be of syphilitic origin or a syphilitic reaction may be grafted on to some other condition. The part that syphilis plays, if any, in such conditions is however by no means clear. It is possible that organization of the exudate after pneumonia instead of resolution may be aided by a syphilitic infection and hence be more common in subjects with syphilis. We have met with atrophy and fibrosis of the testes in two syphilitic cases. We have found nothing to suggest that ordinary atheroma, met with as a senile condition, is in any way due to syphilis or more common at an early age in syphilitic subjects. We have nothing to suggest that syphilis plays a part in chronic interstitial nephritis or renal fibrosis. In the majority of cases cerebral hæmorrhage seems unrelated to syphilis. By the recognition of the syphilitic lesions mentioned above, supplemented when possible by Wassermann reactions, we must rely for an estimation of the percentage of syphilis in persons who come to autopsy.

For the last year we have kept special headings for those patients on whom a Wassermann test was done with a positive result and for those giving no reaction. The cases are too few yet for consideration, but eventually interesting comparisons may perhaps be made.

In addition to the 1,600 *post mortem* examinations at the Adelaide Hospital, 145 have been carried out at the Mental Hospital and these have all been tabulated in the same way. The results may be briefly summarized as follows.

In 60 of the 1,600 *post mortem* examinations, that is 3·75%, definite syphilitic lesions were found, and in 19 more there were lesions which were probably in some cases and possibly in other cases syphilitic. These 76 cases, if syphilitic, would give a percentage of 4·9. One can say, therefore, that approximately 4·25% of the population examined *post mortem* gave evidence of syphilitic lesions. This does not mean that a little over 4% of these patients had died as an ultimate result of a syphilitic infection. Dr. Anderson has carefully scrutinized for me the figures for syphilitic aortitis, syphilitic disease of the aortic valve and aneurysm and finds that whilst in the case of the two latter conditions a syphilitic lesion is almost invariably the real cause of death, in the case of simple syphilitic aortitis the average age at death is higher and the patients tend to die from something else. Such diseases as locomotor ataxy and general paralysis of the insane may give rise to death indirectly from bed-sores or from cystitis and pyelitis *et cetera*. It is clear that well under 4% of these patients thus died as a result of their syphilitic infection.

Syphilitic Aortitis.

In fourteen cases syphilitic aortitis was found and there were six additional doubtful ones. The yielding of the wall in some cases gave rise to dilatation of the aortic ring and regurgitation, though without actual involvement of the cusps themselves. One patient also had a gumma of the interventricular septum of the heart.

Syphilitic Aortitis and Disease of the Aortic Valve.

In nine cases syphilitic aortitis was found with one case in which the lesion was a doubtful one.

Aneurysms of the Aorta with Syphilitic Aortitis.

There were twenty-eight aneurysms of large vessels altogether. One seemed definitely due to the giving way of a senile atheromatous wall. A second case was a dissecting aneurysm. In neither of these did we consider that syphilis was present. In nearly, if not all of the remaining cases, a typical syphilitic aortits was recognizable beyond the area affected by the aneurysm.

It will thus be seen that a syphilitic aortitis was present in 49 (3%), perhaps in 56 (3·5%), of the 1,600 bodies examined *post mortem* inasmuch as it was met with in the cases of aneurysm, as well as in those with disease of the aortic valve. This is by far the commonest syphilitic lesion found at autopsies.

Locomotor Ataxia.

There were three cases of *tabes dorsalis,* two were in males aged forty-three and sixty-seven, and one in a female who was aged forty-eight. The male of sixty-seven had also a Charcot's wrist and syphilitic aortitis. The other two patients had infective cystitis and pyelitis.

General Paralysis of the Insane.

There were two cases of general paralysis of the insane. One was in a woman of forty-one, the other occurred in a congenital syphilitic aged ten and in this case the atrophy of the brain was very definite and there were syphilitic ulcerations of the palate.

Syphilitic Cirrhosis of the Liver.

Syphilitic cirrhosis of the liver was diagnosed four times. In an additional case a doubtful gumma was present. In some patients with syphilitic lesions elsewhere, specks or even scars were met with in the liver, possibly of syphilitic origin.

Gumma of the Brain.

Gummata of the brain were met with in two cases. In another patient who died with cerebral symptoms and gave a Wassermann reaction, permission to inspect the brain was refused, but it was thought that a gumma might be present.

Syphilitic Meningitis.

Syphilitic meningitis was present in one case.

Cerebral Vascular Syphilis.

Softening of the brain attributed to syphilitic disease of the vessels was present in one instance.

Syphilitic Lesions of the Lungs.

In four cases it was thought that fibrosis in the lungs might have been contributed to by a syphilitic infection. There were three possible gummata of the lung, one possible syphilitic pneumonia and four cases with organizing pneumonia or carnification instead of resolution.

Perforation of the Palate.

A woman of fifty-three had an old stenosis of the glottis and an old perforation of the palate. An organized pneumonia was also present and it is possible that the obvious syphilitic infection might have helped to bring this about instead of resolution. The boy with congenital syphilis and general paralysis had syphilitic ulceration of the palate.

Syphilitic Osteitis of the Skull.

A patient with syphilitic osteitis of the skull also had a deep scarred area in the lung. He was a boxer and died from subdural and traumatic hæmorrhage resulting from his occupation.

Fibrosis and Atrophy of the Testes.

Two cases are noted as manifesting fibrosis and atrophy of the testes, namely the patient with the syphilitic osteitis of the skull and another patient with syphilitic aortitis, atrophy of the optic nerve and atheroma of the vessels of the brain.

It should be noted that in the above tabulation some patients had more than one lesion and so will appear under more than one heading.

Post Mortem Examinations at the Mental Hospital.

In the 145 *post mortem* examinations at the Mental Hospital we find that the cases with syphilitic or possibly syphilitic lesions total fourteen. Probably thirteen of these were really syphilitic, though perhaps only eleven. The percentage, therefore, of those showing definite syphilitic lesions is well under ten.

General Paralysis of the Insane.

There were nine clinical definite cases of general paralysis of the insane supported by the *post mortem* results and in some cases by a Wassermann reaction. Another case in which no response was obtained to the Wassermann test, was probably general paralysis of the insane. In a second case this disease was also probably present and in one the diagnosis remained doubtful after the examination had been concluded. Out of the nine definite cases, seven were in males and one in a female. Their ages varied from thirty-six to fifty-six, the average age being 43·6 years. In three of the nine definite cases there was syphilitic aortitis, one in addition having a perforating ulcer of the foot and another an ulcer of the palate. In a third case there was slight syphilitic aortitis.

Aneurysm.

One patient, a male aged thirty, had a saccular aneurysm of the ascending aorta which had ruptured into the mediastinum and thence into the left pleura, as well as a syphilitic aortitis and early syphilitic disease of the aortic valve.

Syphilitic Aortitis.

Five patients suffered from syphilitic aortitis, four being the general paralytics mentioned above and the fifth being the patient with the aneurysm.

Gumma of the Brain.

A patient with gumma of the brain died three months after admission to the Mental Hospital. On admission she had a perforation of the soft palate. A gumma adherent to the meninges was present in the parieto-occipital region on the right side.

Multiple Syphilitic Lesions.

It is of interest to ascertain to what extent more than one lesion due to syphilis or probably due to syphilis, is met with. The interest is twofold: first, to see whether when the spirochætes have, as it were, entrenched themselves in a particular part of the body and are causing a serious reaction there, other parts of the body are less likely to be invaded, possessing perhaps some temporary immunity. The

other aspect of interest is to see whether there are any other lesions associated with definite syphilitic ones whose real syphilitic ætiology is suggested by this association, but not by their own characteristics. For instance, we will see shortly that in a considerable number of cases in which there were definite syphilitic lesions, there was also some organization of a pneumonic exudate or fibrosis in the lungs, suggesting that perhaps the association was more than merely accidental. I have prepared a summary of the *post mortem* examinations dealt with in this paper, showing the presence of syphilitic lesions.[1] In these summaries all the associated lesions are noted so that anyone interested in the matter can go through them and possibly elucidate further points of interest.

In only four of the 60 definite (or the 76 definite and possible) syphilitic cases at the Adelaide Hospital) was there shown the presence of more than one lesion definitely syphilitic. These comprised the following: Syphilitic aortitis + syphilitic ulceration of the skin; locomotor ataxy + Charcot's wrist + probable syphilitic aortitis; syphilitic meningitis + syphilitic coronary disease; syphilitic aortitis + gumma of the interventricular septum of the heart.

In ten cases there were, however, lesions present which may have been syphilitic in addition to the obvious syphilitic lesion. Thus it is rather significant that in six patients with definite syphilitic lesions there were present in the lungs either an organized pneumonia or carnification or what was considered a syphilitic pneumonia or fibrosis or scarring. Two patients with definite syphilitic lesions had fibrosis of the testes. A patient with syphilitic aortitis had a large firm spleen. In the body of one with syphilitic aortitis small specks in the liver were present and in one with aneurysm of the descending aorta calcified specks in the spleen—lesions which may possibly have been syphilitic. It is rather interesting to note also that in the bodies of two patients with syphilitic aortitis (in one, however, the lesion was somewhat doubtful) there was found as an associated condition fibrosis or hypertrophy of the pylorus. Three of the bodies as a matter of fact manifested the association of three possible syphilitic lesions, namely, syphilitic aortitis + large firm spleen + organizing broncho-pneumonia; syphilitic aortitis + fibrosis of the testes + atrophy of the optic nerves; syphilitic osteitis + fibrosis of the testes + a deep scarred area in the lung, possibly due to fibrosis from unresolved pneumonia.

In the 145 *post mortem* examinations at the Mental Hospital more than one syphilitic lesion was present in four out of fourteen cases. Thus in four cases of general paralysis of the insane there were three with definite syphilitic aortitis and one slight. In two cases there were three syphilitic lesions, namely general paralysis of the insane, perforating ulcer of the toe and syphilitic aortitis in one case and general paralysis of the insane, ulcer of the palate and syphilitic aortitis in the second.

[1] Professor Cleland circulated the summary for the information of members. They are not published owing to lack of space.

Other Associated Lesions.

Three patients had malignant growths as well as syphilitic lesions. Two of these three growths were carcinomata of the œsophagus, both associated with syphilitic aortitis, though in one of the two this was described as possibly syphilitic. The other patient had syphilitic aortitis and carcinoma of the stomach. All these three patients with malignant growths were over sixty. One patient with syphilitic lesions had diabetes and a small fatty pancreas. A patient who died from pulmonary embolism after cystotomy for urethral stricture, had syphilitic aortitis; it is possible that his stricture had a syphilitic origin. A patient who died with an ununited fracture of the femur, had slight syphilitic aortitis and manifested the scar of a duodenal ulcer.

Summary.

1. A little more than 4% of bodies of patients examined *post mortem* at the Adelaide Hospital show the presence of syphilitic lesions.

2. Less than 4% of patients died as a direct or indirect result of syphilis.

3. At the Mental Hospital under 10% show syphilitic infection. These mostly died as a result of a syphilitic infection.

4. In the Adelaide Hospital cases syphilitic aortitis is by far the commonest lesion. In about half of the cases in which it occurs, an aneurysm results. In a considerable number of the remainder the disease affects also the aortic valve. From both these conditions the patient is likely to die. The length of life of the remainder in which there is syphilitic aortitis alone does not seem to be appreciably shortened.

5. Organization of the lungs after pneumonia and fibrosis in the lungs may possibly sometimes have a syphilitic basis.

Reports of Cases.

A CASE OF LYMPHATIC LEUCHÆMIA WITH TUMOUR FORMATION AND METASTASES.

By JOHN A. MCLEAN, M.B., B.S.,

AND

JOHN FIDDES, M.D.,

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IN view of the still unsettled relationship of the leuchæmias to tumour formation, the following case appeared to us of sufficient interest to be reported.

Clinical Notes.

M.H., a female patient, aged sixty-seven years, was admitted to the Alfred Hospital on November 2, 1927. She complained of pain in the legs and shortness of breath of about seven months' duration. There was nothing outstanding in the family history and the patient had had no previous illnesses. She said that during the past seven months she had experienced giddy feelings and shortness of breath on exertion. Six months ago a nagging pain came on at the back of the left thigh and leg, which she thought was sciatica. This has been present on and off ever since. A bearing-down pain had also appeared in the right thigh and leg during the last two weeks. Five

months previously the veins of both legs became knotty and swollen and she found it difficult to stand up. She has been very weak and has lost much weight during the last seven months.

On examination the patient was found to be a middle-aged woman of pallid complexion. The eyes, tongue and teeth were normal. The apex beat of the heart was palpated in the fifth left intercostal interspace twelve and a half centimetres (five inches) from the mid-line. The heart sounds were very faint, but normal and the rhythm was regular. The lungs presented no abnormality. The abdomen was protuberant and on palpation the liver and spleen were found to be enlarged. The edge of the spleen was twenty-four centimetres (nine and a half inches) from the left costal margin and the liver edge was sixteen and a quarter centimetres (six and a half inches) from the right costal margin. No enlargement of the superficial cervical axillary inguinal and popliteal lymph glands was found.

A vaginal examination revealed a solid tumour of the left posterior region of the pelvis intimately adherent to the bone. The patient was admitted with the diagnosis of abdominal malignancy.

A blood examination was made soon after admission with the following result. Hæmoglobin 76%; red blood corpuscles 3,600,000 per cubic millimetre; white blood corpuscles 200,000 per cubic millimetre. The film showed slight poikilocytosis and anisocytosis of the red cells. There were many basket cells in the film, the proportion being 40% of the white cells present. Differential count excluding basket cells revealed polymorphic neutrophile cells 2·5%, small lymphocytes 91%, large lymphocytes 5%, monocytes 1%, myelocytes 0·5%.

There was no oxidase reaction, showing the leuchæmia to be of the lymphatic type.

The urea content of the blood was forty-five milligrammes per hundred cubic centimetres of blood. The urea concentration after one hour was 2·6% and after two hours 2%. The patient was given 0·12 mil (two minims) of Fowler's solution three times a day with increasing doses.

The condition of the patient remained unchanged and a blood examination on November 25, 1927, revealed the following figures: Leucocytes 210,000 per cubic millimetre; hæmoglobin 72%; red blood corpuscles 3,200,000 per cubic millimetre. The percentage of lymphocytes was 91% in the differential count.

On December 1, 1927, the patient was put on benzol treatment, 0·5 gramme three times a day after food and on December 9 the leucocyte count was 43,000, the hæmoglobin 60%, the red blood corpuscles 3,200,000, the percentage of lymphocytes 86%, of neutrophile polymorphonuclear cells 13% and of monocytes 1%.

On December 12 the patient was taken off benzol. A blood examination on December 16 revealed a leucocyte count of 58,000 of which 89% were lymphocytes. On December 23 the leucocyte count was 45,000.

The temperature chart showed several slight deviations from the normal. An evening temperature of 38·3° C. (101° F.) was recorded on November 14 and a temperature of 38·3° C. (101° F.) on November 29 and 30. During the first two weeks of December the curve ran an irregular course, ranging from 36·1° to 38·8° C. (97° to 101·8° F.). From this onward until the patient's death the temperature remained slightly subnormal.

Microscopic examination of the urine was normal. Albumin was present, varying from 0·25‰ to 0·5‰.

The clinical condition of the patient remained much the same until death occurred rather suddenly on January 10, 1928.

Post Mortem Examination.

A *post mortem* examination was made on January 11, 1928, the subject being a middle-aged woman with œdematous legs and enlarged abdomen. She looked rather wasted. The superficial lymphatic glands, cervical, inguinal and axillary, were palpable and slightly enlarged. The brain was removed and was found to be apparently normal. The pharyngeal and palatine tonsils were not enlarged and the pharynx appeared normal. There were a few petechial hæmorrhages scattered over the laryngeal mucosa. The trachea presented no abnormality.

Some clear pleural effusion was present on both sides. Scattered over both lungs were white subpleural plaques raised above the surface and of a hard consistency. The right lung weighed 652 grammes, the left 567 grammes. On section œdema and patchy congestion were found, with occasionally a small white tumour mass with well defined edge and of hard consistency. Microscopically, the lung was found almost normal in parts with congested capillaries which showed the excess of lymphocytes in the blood. In other parts, where large aggregations of lymphoid cells were found, the lung tissue was dead, broken down and hyaline. In the neighbourhood of the lymphoid nodules were seen many large mononuclear cells and giant cells, both mononuclear and multinuclear.

The pericardium contained 114 cubic centimetres of clear yellow fluid. The heart weighed 410 grammes and there was increased epicardial fat, especially over the right ventricle. The aortic and pulmonary valves were competent to the water test and the mitral and tricuspid were incompetent. The circumferences of the valves were: mitral nine centimetres, tricuspid ten centimetres, aortic six centimetres and pulmonary seven and a half centimetres. Small, soft, papillary vegetations were present on the mitral valve along the line of apposition of the cusps. The aortic valve also had a line of small cauliflower-like vegetations along the edges of the three cusps. Microscopically these vegetations were seen to be composed of fibrin with entangled leucocytes and platelets. The valve itself showed a slight inflammatory reaction. The myocardium was pale in colour and of a soft consistency. Coronary arteries were normal. There were many yellow plaques over the ascending thoracic aorta. Microscopically the connective tissue following and supporting the vessels and other structures was rather increased and looser in arrangement than normal. It was infiltrated with lymphoid cells, but not to the massive extent found in other organs. There was practically no infiltration between individual fibres. The heart vessels appeared normal.

The heart muscle fibre stained well, showed striation clearly, the nucleus showing clearly but with slight increase in bipolar pigmentation. In parts chosen for section no distinct degeneration of the myocardium was found.

The stomach, œsophagus and intestine presented no abnormality either macroscopically or microscopically. The liver (Figure I) was enlarged and weighed 3,950 grammes. It was pale in colour with numerous white nodules and small tumour masses of hard consistency protruding from the surface. The largest mass was about the size of a golf ball and was adherent to the right suprarenal gland.

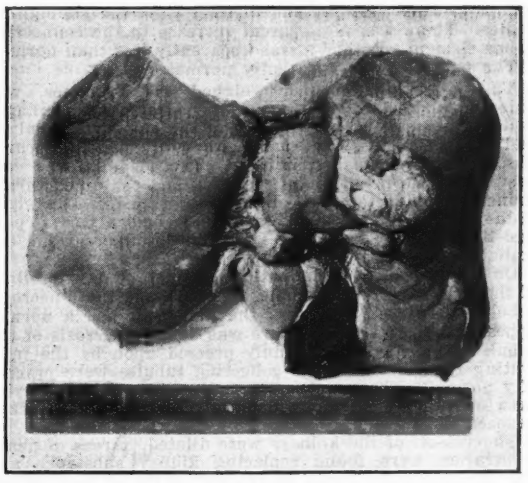

FIGURE I.
Inferior Surface of Liver Showing Tumour Formation.

On section the liver tissue bulged and was of soft consistency. The cut surface was light brown in colour with yellow mottling. The gall bladder contained cholesterol calculi, but no other abnormality was noted.

Microscopical examination of the liver revealed great infiltration of lymphoid cells in the portal spaces and periphery of the lobules. There was infiltration between the liver cells which became less marked towards the central vein. The liver cells were separated so that the usual radiating arrangement was lost. The hepatic cells appeared to be granular, but treatment with Sudan-III did not show any undue fatty degeneration. In the tumour part of the liver there were densely packed areas of lymphoid cells in a stroma containing larger cells with a vesicular nucleus and a few giant cells.

The spleen (Figure II) was uniformly enlarged and weighed 2,700 grammes. On section the cut surface bulged and was of soft consistency, showing a white speckled appearance on a reddish purple background.

Microscopically the spleen tissue appeared extremely hæmorrhagic, the sinuses and veins showing excess of lymphoid cells. Areas of packed lymphocytes were seen as in other tissues. The sharp distinction between pulp and Malpighian bodies was not so definite as is usual owing to the large proportion of leucocytes, especially lymphocytes, which were present in the dilated veins and sinuses. Numerous areas of congested aggregations of

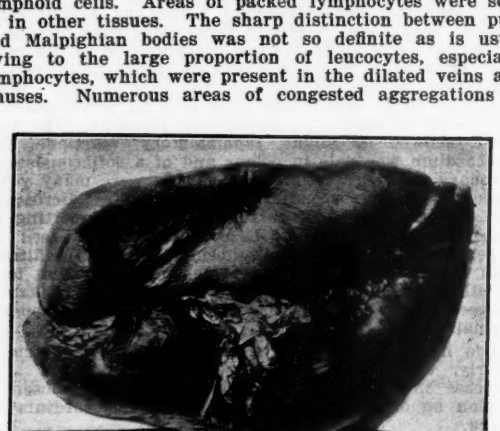

FIGURE II.
Spleen.—Generalized Enlargement with Increase in Size of Splenic Lymphatic Glands.

lymphoid cells were present, distinct from the Malpighian bodies. There was no apparent increase in the connective tissue element. Rather it was apparently less than normal.

The pancreas was apparently normal.

The left kidney which weighed 354 grammes, was enlarged and pale, with numerous scattered hæmorrhages and a few small cysts. On section the cut surface bulged and the cortex was very pale with white mottling which obscured the normal striations. The medulla was congested and the pelvis slightly dilated and contained turbid urine. The ureter was slightly thickened. The right kidney which weighed 184 grammes, had a cortex pale and ill-defined. The capsule was slightly adherent and the stellate veins were very congested.

On microscopical examination distinct cloudy swelling of the kidney secreting tubules and here and there necrotic tubules were seen. Most of the glomeruli had a normal appearance except where there was definite necrosis of the tubules. Except where unduly pressed upon by the infiltrating lymphoid cells the collecting tubules were practically normal. There was much infiltration of lymphocytes between tubules and near glomeruli and specially marked beneath the capsule.

The vessels of the kidneys were dilated. Areas of dense infiltration were found replacing kidney substance and causing pressure atrophy in adjacent parts. Except where damage was done by pressure the only part of the kidney substance seriously affected was the secretory tubules. The appearance in parts was microscopically identical with the

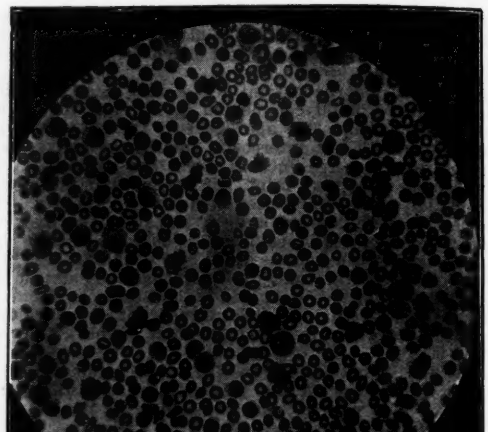

FIGURE III.
Blood Film.—Picture of Lymphatic Leuchæmia.

picture of lympho-sarcoma. The ureter wall was densely infiltrated with lymphoid cells.

There was a tumour situated extraperitoneally over the left posterior and lateral aspect of the pelvis. It was about the size of a man's clenched fist and was of hard consistency with well defined irregular edge, displacing the rectum and uterus, but not attached to them. It was adherent to and inseparable from the bone.

Microscopically the tumour was seen to be composed of densely packed lymphocytes arranged in groups in a stroma composed of larger cells with round or oval vesicular nuclei. There were in the stroma a large number of giant cells, both mononucleated and multinucleated. Here and there in the tumour hæmorrhages were found and large areas of necrotic tissue.

In one part of the tumour nerve bundles were seen surrounded by lymphoid tissue and apparently uninjured

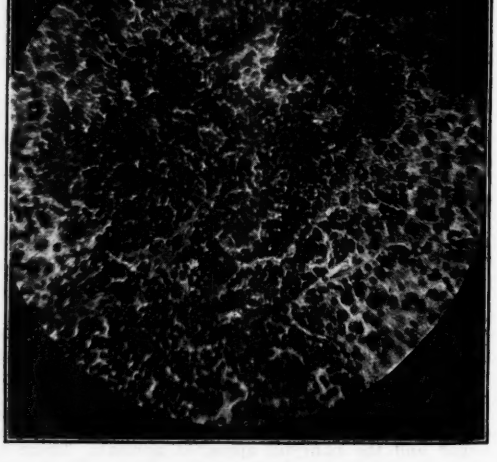

FIGURE IV.
Pelvic Tumour Showing Lymphocytes, Large Cells with Oval Vesicular Nuclei and Giant Cells.

by the infiltration with the tumour cells. These bundles were part of the sacral plexus which was pressed on by the tumour. There were many mitotic figures in the lymphoid cells of the tumour. In a decalcified section of bone adjacent to the tumour there was much erosion of the spongy framework of the bone and a great infiltration with tumour cells.

The abdominal lymphatic glands had undergone varying degrees of enlargement. The mesenteric glands were practically unaffected, while the lumbar chain of glands were enlarged to a medium extent. The cœliac glands were about the size of almonds and the superior gastric and hepatic glands were greatly enlarged, forming nodular masses varying from 1·0 to 3·5 centimetres in diameter and 1·0 to 10 centimetres in length. On section the cut surface was swollen, pinkish-white in colour and of soft consistency.

Microscopically it was seen that the glands were packed with lymphocytes which obscured the normal lobulation. A few swollen reticulo-endothelial cells were seen, but they were not prominent. The lymph sinuses and vessels showed up as clearer areas on the dark background of lymphocytes. No germinal centres were seen. The paraortic glands were only slightly enlarged. There was a dense microscopic packing with lymphocytes with loss of normal structure and no germ centres could be distinguished. Intimately mixed with the lymphocytes were red blood corpuscles. The reticulo-endothelium was not conspicuous. In the sinuses of the medullary part were many giant cells. The sinuses were well filled with blood and many giant cells contained red blood corpuscles. The capsule of the gland was not invaded.

One of the anterior mediastinal glands was enlarged to about the size of a small walnut. The other mediastinal glands were also enlarged to a lesser extent. The tracheal and bronchial glands were enlarged as also the deep cervical chain of glands which were pink in colour on section and of soft consistency.

The superficial cervical axillary and inguinal glands were slightly enlarged and of firm consistency. On microscopical examination these superficial glands were seen to be densely packed with lymphocytes, obscuring the general structure of the gland.

A piece of the shaft of the femur twelve and a half centimetres (five inches) below the great trochanter was removed. The bone marrow was reddish-grey in colour and microscopically showed scattered fat cells. There was a generalized infiltration with lymphocytes and the myeloid cells appeared decreased in number and relatively few megalokaryocytes were seen. Mitotic figures were very few.

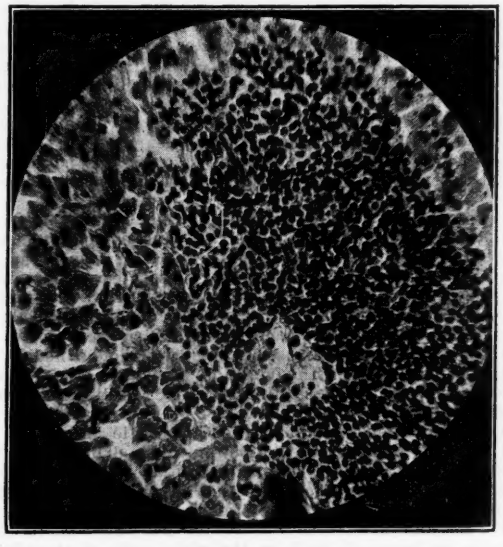

FIGURE V.
Liver.—Infiltration of Portal Canal with Lymphocytes.

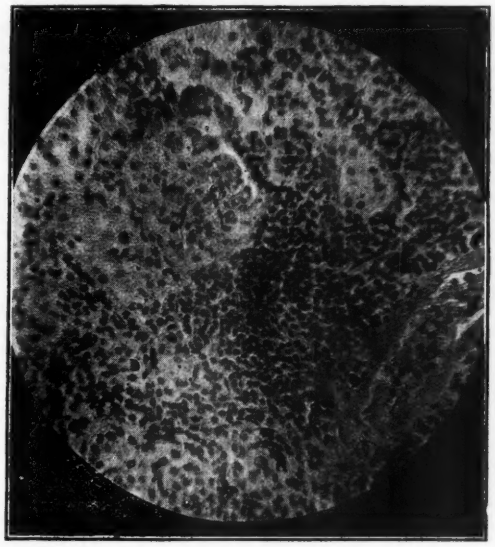

FIGURE VI.
Kidney.—Infiltration of Lymphocytes with Destruction of Tubules.

Discussion.

Among hæmatologists there is as yet no universal agreement as to the ultimate origin of the small lymphocytes of the blood. Some authorities contend that all blood cells arise from a common ancestor, derived from the reticulo-endothelium which persists in post-natal life and which is called the lymphoidocyte or hæmocytoblast. The other view is that the lymphoidocytes disappear before birth, leaving only myeloid and lymphatic stem cells to carry on the process of hæmatopoiesis in post-natal life.

Most authorities agree that lymphocytes develope in the follicles found in lymphatic glands, tonsils, spleen, alimentary canal and elsewhere.

Coincident with the various views on the process of blood formation there is uncertainty as to the origin of the leuchæmias. Gulland and Goodall,[1] Reed[2] and other observers believe that the bone marrow is the starting point and essential seat of lymphatic leuchæmia. Actively proliferating cells from the marrow are carried by the blood to other tissues and organs where they multiply and there is a packing of lymph glands, infiltration of organs, adipose and other tissue with lymphocytes and even the formation of lymphoid new growths. But according to Piney[3] there is an absence of lymphatics and lymphocytes in normal marrow and it cannot be readily accepted that a persisting remnant of primitive blood-forming tissue in the marrow is responsible for such an enormous outflow of lymphocytes and practically no other blood cells. We infer that the accumulation of lymphocytes in the marrow in lymphatic leuchæmia is a blood-borne infiltration.

MacCallum[4] considers that hyperplasia of lymphoid tissue wherever that occurs is the factor producing chronic lymphatic leuchæmia.

Hyperplasia of lymphoid tissue is found in several forms, the relationship of which is still a matter of controversy among competent observers. In the first place there is the straightforward lymphatic leuchæmia when, as already stated, there is hyperplasia of lymphoid tissue manifested by a great increase in lymphocytes in the circulating blood. Then there are forms with the characteristics of tumour formation, that is lympho-sarcoma, lymphatic myeloma and round celled sarcoma. The latter may be excluded in this article as its relationship to the lymphoid series is uncertain. It may arise from connective tissue almost anywhere.

Sternberg[4] describes an intermediate group where actual tumour formation is accompanied by a leuchæmic condition of the blood in which lymphocytes are in great preponderance. Naegeli and other observers asserted that ordinary lymphatic leuchæmia was sometimes accompanied by tumour-like infiltrations in the tissues and that Sternberg's leuco-sarcomas were merely lymphatic leuchæmias. Naegeli also makes a special point of saying that all lymphoid tissue is equally involved in the process.

Piney[5] states that it is rare for all the lymphatic tissue of the body to be equally involved in the hyperplasia and that some parts remain absolutely unaffected. This opinion is borne out by Gulland and Goodall[1] who have observed that, for instance, the alimentary tract is generally unaffected. Lenaz defines hyperplasia as an increase in normal cells in normal arrangement and by this definition lymphatic leuchæmia which proliferates without arrangement into follicles, is therefore not a simple hyperplasia. Banti and others claim that the lymphatic leuchæmic process is always neoplastic.

Several observers have mentioned instances in which round cell sarcomata have by erosion discharged their cells into the general circulation, simulating a true leuchæmia. Another conception as to the causation of leuchæmia is that it is due to some virus or irritant. Fowl leuchæmia has been transmitted by a cell-free filtrate and in certain acute leuchæmias there is an irregular fever which favours an infective basis. The fowl leuchæmia is never lymphatic in type and there is no direct bearing on the present case.

We shall now give more detailed consideration to the case under discussion.

The growth in the pelvis has the characteristics of a true tumour of malignant tendency. There is locally an invasion and destruction of surrounding tissue, namely the pelvic bone. Then in distant parts there are apparently metastatic growths, such as those in the lung and the liver. This tumour in the pelvis could be described as a lympho-sarcoma were it not for the widespread metastases and the leuchæmic condition of the blood.

It seems to us very unlikely that a typical lymphatic leuchæmia could by infiltration produce such a tumour in the pelvis with the malignant characteristics mentioned. Until the normal mechanism which governs the entry of lymphocytes into the circulation and by which they are kept at a constant level is known, the exact relationship between the tumour formation and the leuchæmia cannot be ascertained. It is possible that some condition emanating from the tumour or elsewhere may have a stimulating effect on the lymphoid tissue, particularly the glands causing hyperplasia and manifested in the blood as a leuchæmia. We noted that the lymph sinuses of the glands contained an excessive number of lymphocytes which may be an overflow from the packed lymphatic glands into the general circulation. The abnormal appearance of the lymphatic glands need not necessitate hyperplasia, but could be accounted for by infiltration. They certainly held to their capsules in contrast to the invasion of lympho-sarcoma and mitotic figures were not common.

We think we can rule out any possibility of the pelvic tumour passing its constituents into the blood stream by erosion of vessel walls as it seems to us that were such a condition present when the leuchæmia was first recognized, the patient owing to the accompanying toxæmia would not have lived so long and there would have been febrile symptoms. Also the other cells in the tumour were not found in the blood. The excessive number of so-called basket cells in the blood films could be accounted for by the inability of the organs concerned with removal and absorption of degenerate cells to deal with such large numbers.

The endocarditis is evidently a mild type due to superficial necrosis and thrombosis and is identical with the simple endocarditis which occasionally occurs in chronic nephritis and in some cachexias as a more or less terminal event.

In conclusion, we consider that Naegeli's tumour-like infiltrations are not identical with the pelvic tumour in this case, the particular features of which have been discussed. It appears to us that the condition we have described can be classified as a leuco-sarcoma (Sternberg).

We desire to express our gratitude to Mr. Doutch and Mr. Sutherland for assistance with the photographs.

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[3] A. Piney: "The Anatomy of the Bone Marrow," *The British Medical Journal*, October 28, 1922, page 792.
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SPINAL TUBERCULOSIS.

By ALAN J. MACDONALD, M.B., B.S. (Melbourne).

THE patient whose clinical history is given hereunder, was seen by me when I was Senior Resident Medical Officer at the Fremantle Hospital.

Clinical History.

M.R., male, aged thirty years, formerly a barman, was admitted to the out-patient department of the Fremantle Hospital on January 4, 1927, complaining of nausea and retching which he had had for six or seven weeks. He complained of pain in the back on either side of the lumbar part of the spine. He had a dry cough. His tongue was furred and he had lost 0·9 kilogram (two pounds) in weight recently.

A week later he re-attended and complained again of pain in the back, on each side. The last drops of urine were milky in appearance. He was anæmic. Urinary examination revealed no abnormality.

On January 19, 1927, he was admitted to the medical ward with a provisional diagnosis of chronic nephritis, based chiefly on the large pale face of the patient.

Formerly he had been accustomed to taking alcohol freely, though he had not had much of late. There was nothing of importance in his previous or family history.

He complained again of nausea and discomfort after food. His temperature was 38·1° C. (100·6° F.) and the pulse rate 120. Respirations were 26. Albumin was present in the urine. His blood pressure was normal. On examination the heart was normal. There was a pleuritic rub and bronchophony was heard at the left base posteriorly. The abdominal organs appeared to be normal and in regard to his nervous system there was a coarse tremor in the hands, his eyes reacted to light and accommodation, but the knee jerks were sluggish. There were no sensory disturbances. There was a slight degree of exophthalmos.

On February 18, 1927, there were more definite signs of lung involvement. There was a pleuritic rub on both sides in the infrascapular regions. Cough was persistent.

On February 26, 1927, there was a polymorphonuclear leucocytosis of 20,000.

An exploratory puncture of the right chest in this region was made on March 1, 1927, and a small amount of blood-stained fluid was withdrawn. This was found to contain red blood cells and a few leucocytes. There was no growth on culture except some Gram-positive organisms (staphylococci), probably the result of accidental contamination. No tubercle bacilli were seen. The fundi were examined on March 3 and there was a chorioidal nodule at the lower margin of the right disc, bulging the retinal vessels forward and partially obscuring the disc in retinal œdema. Dr. Morlet expressed the opinion that this was either tuberculous, metastatic or syphilitic in nature.

There was still a trace of albumin in the urine.

A few days later he complained of dysphagia and of a burning pain after food felt in the mid-sternal region. Also there was pain in the posterior axillary region of the left side and about the left costal margin. There was definite evidence of fluid in the right side of the chest.

On March 30 he was found to be tender over the right renal area and a mass was palpable.

On April 2 there was bronchophony at both apices and slight pectoriloquay at the bases posteriorly. Breath sounds were diminished at the right base. There was dyspnœa.

On April 3 the leucocytes numbered 9,300 and the red cells 3,900,000 per cubic millimetre. The hæmoglobin estimation was 40%. On April 9 the dyspnœa was more pronounced. The condition of the fundus was unchanged on April 10.

His condition became rapidly worse on April 11 and death occurred on April 12, 1927.

Throughout the illness he ran a hectic temperature which rose to 39·4° C. (103° F.) in the evening. The day before his death the temperature rose to 40·5° C. (105° F.). His pulse rate was in the region of 130 until near the end and the respirations varied between 20 and 40. His bowels were satisfactory throughout and he slept fairly well.

On February 11 and February 22 the sputum was examined for tubercle bacilli, but none were found. The Widal test yielded no reaction on February 14 and no pathogenic organisms were found in the urine. On February 18 the blood was sent for culture and was found to be sterile. No reaction was obtained to the Wassermann test. On March 23 there were no red blood cells, but clumps of pus cells in the urine.

The X ray records were as follows:

On February 21, 1927, a mass was seen in the mediastinum between the level of the first and fourth ribs with definite white spots in the right half of the mass—suggestive of enlarged glands.

On March 1, 1927, a mass was seen in the mediastinum and the lung tissue appeared compressed (fluoroscope).

On March 11 and 16, 1927, the mediastinic mass was more pronounced and the appearances were suggestive of neoplasm.

On March 29, 1927, X ray examination of the kidney showed that this organ was normal in size. There was a slight abnormality in position.

Autopsy.

Post mortem examination revealed an osteomyelitis of the spine extending from the sixth cervical to the second lumbar vertebra with an abscess cavity along the right side of the spine extending over the same distance. The lungs and heart were normal. The liver and kidney were the site of lardaceous changes. Subsequent examination of the wall of the abscess cavity showed it to be tuberculous in nature.

Comment.

A considerable amount of interest was shown in this case by both the honorary and resident staffs as also by one or two other medical men.

There was much divergence of opinion as to the diagnosis, especially for the first six weeks. Firstly there was the possibility of enteric fever, especially in view of the hectic temperature. The pulse rate was somewhat rapid—at least for the early stages of enteric fever. There was nothing characteristic about the motions nor was the onset like that of enteric fever and as a result of there being no reaction with the Widal test this condition was ruled out.

The onset was too sudden for the condition to be a subacute nephritis, although there was the possibility of an acute exacerbation supervening on a chronic condition. He was admitted with a provisional diagnosis of chronic nephritis on account of his large pale face and the pain in the back. The urinary examinations revealed nothing save a trace of albumin and in the absence of any definite urinary changes and of any cardio-vascular changes, nephritis was excluded.

On February 18 there were signs of lung involvement. His chest was examined by X rays and the film revealed a definite mediastinal mass.

The chief possibilities were: (i) Lymphosarcoma, (ii) aneurysm of the descending part of the aorta and the thoracic aorta and (iii) tuberculous disease of the spine. There were lesser possibilities in (iv) carcinoma of the lung, (v) syphilitic osteitis with abscess formations and (vi) Hodgkin's disease.

This mass was definitely in the posterior mediastinum, showed glandular involvement and increased rapidly in size. Carcinoma usually is deeply situated in the lung and X ray examination reveals a well-defined edge.

Syphilitic osteitis with abscess formation was excluded on account of its rarity, the absence of pain and tenderness and absence of response to the Wassermann test. Hodgkin's disease is associated with glandular swellings—discrete at first—in cervical, axillary and inguinal regions, as well as in the mediastinum.

Aneurysmal dilatation of the aorta is rare in the absence of a syphilitic history. There is usually severe pain due to bone erosion. Such an aneurysm would interfere with deglutition and be apt to cause dyspnœa, but would not give rise to the retinal signs, nor would it cause the pleuritic changes. The leucocytosis also was against the possibility of aneurysm.

There are left lymphosarcoma and tuberculous disease of the spine.

In tuberculous disease the general health is affected, local pressure elicits tenderness and there is pain at the site of the disease which is increased on movement. Usually there is deformity with a stiff carriage and in cervical caries the head is held rigid. In cervical tuberculosis there is a likelihood of a retropharyngeal abscess developing which would point in the posterior triangle of the neck or, as in this case, pass down into the mediastinum. The pleuritic changes apparently were transitory, for there were no macroscopical changes seen at the *post mortem* examination, although there was a definite blood stained effusion found on exploratory puncture on March 1. This was probably inflammatory in origin and not due to obstruction.

The chorioidal tumour is quite compatible with the tuberculous condition as also is the leucocytosis, following a secondary infection. The absence of any pain or tenderness or rigidity, along with the result of the tests of sputum and pleuritic effusion, caused the exclusion of tuberculosis in favour of a neoplasm.

The most common form of neoplasm in this region is a lymphosarcoma—usually a rapidly growing tumour, firm, elastic and painless, although as it increases in size, it becomes tender and may cause great pain from erosion of the vertebræ. Such a growth would cause symptoms from pressure on the œsophagus and air passages, cough and expectoration. Anæmia is not rare and malignant disease is not infrequently associated with a leucocytosis. The temperature was attributed to some secondary infection. Again, the chorioidal nodule could have been neoplastic. The exophthalmos apparently was due to sympathetic hypertonus following involvement, probably by pressure, of the cervical sympathetic. The nausea and vomiting were due to toxæmia.

The altered position of the right kidney was undoubtedly due to the downward pressure of the abscess.

The outstanding feature about this case was the absence of pain and tenderness over the cervical spine and the absence, also, of any rigidity and the result of the *post mortem* examination came as a surprise to all concerned.

Acknowledgement.

In conclusion I desire to acknowledge Dr. Blackall's kindness in granting permission for the case record to be published.

Reviews.

THREE BOOKS ON PERSONAL APPEARANCE.

THE care of the skin, hair and personal appearance does not come into the purview of the medical practitioner as a rule. But rarely does he study the essence of a good complexion and still less frequently is he concerned with the remedy of defects of a minor kind. In consequence the charlatan claims this field as his or her own. The so-called beauty doctor, the self-appointed hair specialist, is consulted by women and even by men who value their faces and who set great store on beauty. Every now and

again the charlatan is exposed in the courts of law. The beauty doctor's treatment leads to some horrible disfigurement; the dyeing of the hair results in the acquisition of some startling colour; the removal of superfluous hairs is followed by the appearance of an obvious blemish. Usually, however, the victims of the quack shun the publicity of the court and attempt to cover the harm done as best they may, rather than expose the iniquities of the ignorant advertising impostor who trades on the vanity and misfortunes of the weak.

Dr. Oscar L. Levin has written two excellent little books from the point of view of the skilled dermatologist and is fearless in his handling of a difficult series of subjects. His first book is entitled "Your Hair and Your Health."[1] He recognizes that a great deal of false information concerning the hair has been disseminated among the people and his mission is to dispel these wrong doctrines and to diffuse common sense and truth. He does not address the medical profession. He tells his story to the women of the community, but much of his wisdom may be imbibed by medical practitioners with benefit to themselves and their patients.

There is the essential elementary information concerning the structure, growth, functions and distribution of hair. This is followed by a measured account of the relationship between the general health and the condition of the hair. In simple language the author compels his reader to believe that hair is part of the body and that all attempts to handle it as if it were an independent structure must lead to small or great disaster. He deals with the effects of long continued custom and dares to argue that under certain circumstances disuse continued over many generations will establish properties that become hereditary. In successive chapters he discusses the care of the scalp, the significance of grey hair, the causes of loss of hair, premature baldness, baldness due to constitutional disease and abnormalities of the hair. He has a most estimable knack of exposing the popular fallacies connected with the hair and of replacing these old women's yarns by sound information. He is careful to describe in general terms the nature of affections involving the hair, indicating the type of change and the effect on the normal structure. Having given the essential information, he instructs his reader in regard to the simple remedies that may be applied and concludes with a very cursory record of the treatment that may have to be employed by a medical practitioner. There are defects in the book; the language is not classical; in places the trained reader will have an opinion different from that of the author. But it is probable that if these defects were eliminated and if the book were less lightly written, it would not make so strong an appeal to the public as it undoubtedly does.

Dr. Levin's second book, "The Care of the Face," is better than his first.[2] It is full of excellent advice, of ruthless ridicule of superstitions and of constructive criticism. He follows the scheme adopted in the other book of giving a popular, elementary but sufficient description of the normal structure, function and variations of the skin. The second chapter in this book, too, contains a lucid presentation of the part played by the skin in the general economy of the body, of the dependence of the health of the skin on the health of the body. In writing of the care of the face and the use of cosmetics, the author does not hesitate in telling the truth bluntly. Women would not be content to leave a perfect complexion alone. They do not aim at a close imitation of a natural complexion. They follow a fashion which prescribes the whitening of a healthy pink skin, the reddening of a pale skin and the altering of the colour of an olive skin. No attempt is made to conceal the fact that powder and rouge are used. He has no pity for the vendor of expensive lotions and perfumed creams nor for the beauty doctor who gives the very worst advice in regard to the care of the complexion. He tells his reader plainly how defects, blemishes and imperfections may be reduced or even removed by simple means. Dr. Levin does not object to the use of powder, but he is insistent on the choice of a harmless brand and on its moderate application. He condemns the employment of dyes and paints as harmful to the face and at times to the whole constitution. His sarcasm in regard to the courses given at institutes with high sounding names of creams and a complicated ritual is delightful. From the care of the face he passes on to a splendid chapter on quackery. He exposes in the course of a dozen pages fraud after fraud. At times his indigation gains the upper hand; in other places he is merely scathing; elsewhere he indulges in ridicule. His natural wit prevents him from from writing in a very serious strain on these matters for long. His sense of humour is irrepressible and he is soon forced to express himself in a characteristic manner, half earnest, half joking, that is more convincing than argument or invective. The remainder of the book has the same quality. Whether he deals with the diseases of the fat glands or describes the inflammation of the skin or discourses on moles and other birthmarks, he dispenses sound guidance, manifests reserve in giving technical details to his lay reader and reminds her of the folly and stupidity of trusting the charlatan who screams his or her exaggerated claims and deals out an incalculable amount of harm to an easily persuaded public. The amount of money the public wastes on worthless vaunted remedies is unbelievable.

Of the third book we fear that we have but little to say in its favour.[1] The author, Dr. Josif Ginsburg, is stated to have been at one time at the Government Hospital for Plastic Surgery at Prague. He writes from Los Angeles, which he describes as a city renowned for the use of cosmetics. He openly advocates the beauty doctor, the excessive use of powders, grease paint, rouge on the cheeks, in the nostrils and at the corner of the eye, the application of face massage for the reduction of sagging of the skin and even for the removal of wrinkles. He devotes chapters on the "light skin peel" and the "deep skin peel." The chemical removal of more or less epidermis as a remedy for wrinkles and freckles is unlikely to meet with approval from dermatologists. Some of the advice given is good, but much is the reverse. Some of the information is sound. This book is addressed to the people of Los Angeles, but it is published in Sydney. We trust that the people of Australia will not be misled by its pernicious advice, nor attracted by the gratuitous advertisement included by the author of his work in plastic surgery. He reproduces photographs in pairs of patients on whose noses he has performed correcting operations, before and after pictures. The spelling is inconstant and so is the printing and general get-up.

[1] "Your Hair and Your Health," by Oscar L. Levin, M.D.; 1926. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 173. Price: 6s. net.

[2] "The Care of the Face," by Oscar L. Levin, M.D.; 1927. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 236, with illustrations. Price: 6s. net.

CHEMISTRY FOR STUDENTS.

THE fact that the "Manual of Chemistry" by Simon and Base has reached its thirteenth edition is sufficient evidence that there is still a considerable demand for a work of this kind.[2] The book which is of elementary first year standard, deals with certain fundamental physical conceptions, inorganic chemistry, analytical chemistry and organic chemistry in the compass of some seven hundred pages. The treatment of the subject matter lies along conventional lines and is necessarily rather synoptic in parts. The space given to chemical dynamics seems hardly adequate even in a book of this standard. The subject matter is arranged in such a way that it can be run through conveniently and rapidly. Such an arrangement is highly prized by the student in times of stress and perhaps accounts for the number of editions through which this book has passed.

[1] "The Hygiene of Youth and Beauty," by Josif Ginsburg, M.D.; 1927. Australia: Cornstalk Publishing Company. Sydney: Angus and Robertson, Limited. Crown 8vo., pp. 211, with illustrations. Price: 7s. 6d. net.

[2] "A Manual of Chemistry," by W. Simon, Ph.D., M.D., and Daniel Base, Ph.D.; Thirteenth Edition, Enlarged and Thoroughly Revised by John C. Krantz, Jr., Phar.B., Sc.D.; 1927. London: Baillière, Tindall and Cox. Royal 8vo., pp. 711, with illustrations. Price: 25s. net.

The Medical Journal of Australia

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Reaching the Backblocks.

Some publicity has recently been given to the appointment by the Australian Inland Mission of Dr. K. St. Vincent Welch as flying doctor in the north-western districts of Queensland and the northern part of central Australia. The importance of the experiment for the benefit of humanity and for the development of the fertile but inaccessible regions of the north has been recognized by the people of Australia. The Presbyterian Church of Australia, the initiator of the Australian Inland Mission and of the medical service about to be inaugurated, has earned the grateful appreciation of all true Australians. Everybody realizes that the future greatness of Australia depends not on the growth of the capital cities, not on the development of the secondary industries, important as they may be, not on the ascendency of one political party over the other, but on the settlement of vast areas of land for the production of wheat, cotton, sugar and other crops and for the breeding of sheep and cattle. The courage and industry of the man on the land is proverbial. He has been prepared to face isolation, the heart-breaking results of recurrent droughts, the terrifying difficulties of an uncleared plot and the vagaries of the outside market. But notwithstanding all his problems which to the ordinary man would seem insuperable, and notwithstanding the real dangers associated with the outback life, he has made Australia what she is today. Her riches in the future will be the fruits of his labour. The Australian Inland Mission has published some maps of Australia from which the man at ease in a city can see at a glance what isolation means. Imagine a great circle with a radius of three hundred miles drawn around Cloncurry; imagine another such circle drawn around Alice Springs and a third drawn around Hall's Creek in the north of Western Australia. Each of these circles encloses an area of about a quarter of a million square miles. But throughout all three the townships with but two or three exceptions are too small to support even a cottage hospital and only a few of them are large enough to support a medical practitioner. In the belt on the east and south-east coast and in the south-west corner of this great continent the population exceeds one person per square mile. Elsewhere it is less dense. In the circle areas the man on the land may have to travel four hundred miles over bush tracks or through unbroken country to reach the nearest hospital or doctor. When he meets with an accident or is overtaken by disease, he is practically out of reach of trained help. In the Cloncurry circle there is one medical practitioner and a hospital with forty beds at Cloncurry, one medical practitioner and a small hospital with eight beds at Camooweal, one medical practitioner and a hospital with forty beds at Kurridala, one medical practitioner and a small hospital at Boulia, two medical practitioners at Richmond and two at Winton and one at Burketown and one at Normanton. An area the circumference of which measures 1,885 miles and the surface of which is equivalent to approximately 250,000 square miles, is served by ten doctors and one district nurse. The Australian Inland Mission is seeking the remedy and proposes to make an experiment with the object of giving the brave people of these isolated districts some feeling of security. Up to the present it has been a most difficult task to secure the services of competent medical practitioners for the eight centres in the Cloncurry circle. Over and over again Camooweal has been left without a medical practitioner. It has not been possible at times to induce experienced and reliable medical practitioners to take the positions as medical officers at the hospitals. There is little or no private practice at many of these places and the inducements offered to medical practitioners are not great. This increases the difficulties of the position. The Reverend J. Flynn, the Superintendent of the Australian Inland Mission, has taken steps to establish wireless communications at places in the Barkly tableland where there is no telephone or telegraphic service. The arrangements made with the Queensland and Northern Territory Aerial Service to supply an aeroplane and a pilot have rendered it possible for the Mission to start the great experiment. Dr. St. Vincent Welch is pre-

pared to make a considerable sacrifice for an ideal. For twelve months he will be at the disposal of the people of this extensive track of land. He will lend assistance to the local medical practitioners by meeting them in consultation, administering anæsthetics or helping them at operations. He will visit patients in emergency and will convey them in the aeroplane to the nearest hospital when this course is necessary. He will pay regular visits to places where there are no local medical practitioners. In short he will organize and conduct a medical service which will remove some of the hardships and lessen some of the dangers attaching to the life of the man in the backblocks. The flying doctor must be a man of experience and resource. He must be an idealist and be prepared to work for the cause, the safety of the men who are making Australia. It is hoped that when his year has expired, others will come forward with the same spirit, prepared to sacrifice a year for an ideal, ready to take risks, to endure discomfort, to forget self interests. The medical profession in Australia contains many men big enough, altruistic enough and brave enough to follow the example of the first flying doctor of the Australian Inland Mission.

Current Comment.

CARDIO-VASCULAR SYPHILIS.

THE three papers by Burnell, Matters and Cleland published in this issue, deal with two important aspects of syphilitic infection. Burnell and Matters have given in detail the form of treatment adopted at the night clinic in Adelaide and Cleland has described syphilitic lesions discovered in a large number of *post mortem* examinations. Cleland's findings demonstrate the importance, if indeed this demonstration is necessary, of early and energetic treatment. He has shown that 4% of the persons who die in the Adelaide Hospital and whose bodies are submitted to *post mortem* examination, are affected by gross syphilitic lesions. It is probable that these figures are an approximate indication of the occurrence of syphilitic lesions in the general community. He has been wise in describing the findings at the Parkside Mental Hospital under a separate heading, since syphilis is supposed to play such a prominent part in the causation of disease of the central nervous system. The figure of 10% with syphilitic lesions in this institution is possibly not so high as would be expected. Cleland has shown that aortitis is the commonest syphilitic lesion and that it is frequently associated with aneurysm. Unfortunately he has confined his attention to the existence of the lesion and has not given any detailed description of the macroscopical and microscopical appearances. In these circumstances it will be useful to consider two papers which have been recently published on this subject.

O. Saphir and R. W. Scott have studied the involvement of the aortic valve in syphilitic aortitis.[1] The material available to them was that obtained in seventy-one cases. Sections were cut from various parts of the ascending and descending aorta and from different parts of the aortic valve. In all instances there was a fusion between the lateral portion of the leaflets of the aortic valve and the aortic wall of the sinus of Valsalva. This naturally leads to a widening or separation of the commissures. In sixty instances hyaline plaques were found in the region of the commissures, but no relationship could be established between the size of these plaques and the degree of separation of the commissures. In the majority of cases there was a considerable thickening of the central portion of the free margin of the cusps, eversion or rolling was present in twenty and retraction in five cases only. In twenty-five instances the mouths of the coronary arteries were constricted. On histological examination it was found that perivascular infiltrations of round cells were present in all sections and that this was more pronounced in the *tunica adventitia*. Particularly in early cases it was seen that endothelial proliferation in the *vasa vasorum* of the *tunica adventitia* led to partial or even complete obliteration of their lumina. There were perivascular changes around the *vasa vasorum* of the *tunica media*, but these changes were of less frequent occurrence. Numerous necrotic areas were also seen in the *tunica media* independent of leucocytic infiltration. The authors, therefore, do not believe that the areas of necrosis in the *tunica media* are always the result of breaking down of lymphocytic infiltration, but that they are the result of obliterative endarteritis of the *vaso vasorum*. They also found that the affected parts of the leaflets and of the aortic wall of the sinus of Valsalva are affected first by degenerative and later by chronic inflammatory changes. It should be pointed out that the findings of Saphir and Scott differ somewhat from those of earlier observers. The use of the term *mesaortitis syphilitica* seen in the older literature indicates that the primary lesion is situated in the *tunica media*. Later writers describe changes similar to those of Saphir and Scott; in the latest edition of Green's textbook practically the same wording is used. Some have described a productive inflammation spreading through the commissure into the free margins of the leaflets causing them to become thickened. This is different to the formation of adhesions between the lateral portions of the leaflets and the *tunica intima* of the aorta described by Saphir and Scott. They regard the formation of hyaline plaques as secondary.

[1] *The American Journal of Pathology*, September, 1927.

B. J. Clawson and E. T. Bell have also made a study of syphilitic aortitis.[1] They found 126 cases of syphilitic aortitis at autopsy and during the same period 4,577 *post mortem* examinations were performed at the University of Minnesota on the bodies of persons over twenty years of age who died from other causes. This gives a percentage of 2·6. It is not quite so high as the figures given by Cleland, namely 3% certain and 3·5% possible cases. It is interesting to note that the cause of death in the 126 cases was as follows: aortic insufficiency, forty-six cases; sudden death from closure of the coronary orifices, twenty-five; rupture of aortic aneurysm, thirty-five; gumma of the myocardium, three; other causes, seventeen. The cases are considered in groups by the authors according to the cause of death. The aortic insufficiency group numbered forty-six, as already stated. Twenty-eight hearts only were reserved for study. The lesion in syphilitic valvulitis consists of a cord-like thickening of the free margins of the cusps. This thickening may be at the aortic attachments of the cusps alone, but generally it extends the full length of the free margin. As a rule all the cusps are affected, but one or two cusps or a part of a cusp only may be involved. The cusp is not diffusely thickened, as in the rheumatic infection, and fusion of the cusps does not occur. The functional end-results of a syphilitic valvulitis are similar to those of a defective valve resulting from a rheumatic infection, excepting that stenosis does not occur. Clawson and Bell also refer to another anatomical valvular injury which they regard as of equal importance to that of the cord-like thickening of the free margins of the cusps. This consists of a proliferative growth of the *intima* of the aorta between the aortic attachments of the cusps. This outgrowth insinuates itself between the attachments of the cusps and pushes them apart. A third cause of insufficiency is possibly dilatation of the aortic orifice. The free marginal thickening was present in twenty-four of the twenty-eight hearts studied, the aortic attachments were separated in twenty-two. In twenty-five hearts gross abnormality was present to account for the decompensation. In the remaining three dilatation of the aortic ring "may have accounted for the insufficiency and failure." Clawson and Bell have not investigated the histological picture in the way in which this was done by Saphir and Scott. They, however, regard the outgrowth described by them as responsible for the separation of the valves. The outgrowths of Clawson and Bell are the same as the hyaline plaques of Saphir and Scott. The latter do not deny that these plaques cause separation. They refer to the common view that this is so, but they point out that in some of their cases separation occurred without the presence of plaques. In fact they reproduce two illustrations which clearly demonstrate this. They believe that there must be some explanation other than what may be called the mechanical explanation. They hold that mucoid degeneration occurs in the *intima* and inner parts of the *media* in the region of the commissures and they assume that the mucoid degeneration is primarily due to nutritional disturbances. Bayne-Jones has shown that the lateral parts of the valves are supplied by the *vasa vasorum* from the aorta. In the event of a nutritional disturbance only those areas supplied by the vessels in question will manifest degenerative changes. These are soon followed by a chronic inflammatory reaction, with consequent organization and contraction, producing what they describe as adhesions. Their explanation depends, therefore, on the vascular changes to which reference has already been made. They regard the thickening of the free edges of the valves described by them and therefore also that described by Clawson and Bell as being due to the continuous mechanical pressure of the blood associated with the insufficiency of the valve. There can be no doubt that the explanation offered by Saphir and Scott is the more complete of the two; it accounts for all the changes which have been mentioned, and it is based on histological evidence; it should therefore be accepted for the present.

In addition to the changes associated with the aortic valves those affecting the coronary arteries call for comment. Clawson and Bell found little gross change in their twenty-eight hearts in the coronary arteries except at the orifices. In twenty-two of the twenty-eight hearts narrowing was noted in one or both orifices. In nine of the hearts, there was a thickening of the walls with atheromatous intimal changes, "the ordinary senile type of coronary arterial disease." Nothing was seen on microscopical examination of these arteries that was different from ordinary senile arteriosclerosis. Hypertrophy was found to be pronounced, but with this exception there was no change in the myocardium which seemed sufficient to cause death; the gross and microscopical injuries were regarded as of little significance. The partial or complete closure of the coronary orifices was regarded as having a large part in producing cardiac failure. This is easily understood, especially when the findings in the group in which death is ascribed to narrowing of the coronary orifices, are read. At the same time the statement that the microscopical findings in the myocardium were of little significance and their comparison with senile arteriosclerosis lead to the supposition that the authors regard the changes as being of this nature. The ages of the patients who died from aortic insufficiency and whose hearts were kept for study, varied from twenty-four to sixty-one; the ages were distributed fairly evenly between these extremes. The myocardial changes cannot under any circumstances be put down to senile changes. The authors' method of expression, to say the least of it, is ambiguous. It is to be noted that in many text books the closure of the coronary orifice as an immediate cause of death is overlooked. Death in these circumstances will not be due to chronic myocardial change, but to acute myocardial arrest, if the expression may be used, as a result of the sudden cutting off of its blood supply.

[1] *Archives of Pathology and Laboratory Medicine*, December, 1927.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Treatment of Intestinal Affections by the "Intraintestinal Thermal Method."

DAMASCO DE RIVAS (*The American Journal of Tropical Medicine*, November, 1927) contributes further reports on the result of treating patients suffering with intestinal infections by the "intraintestinal thermal method." In a previous communication the writer has pointed out that febrile acute bacterial infections of the intestine are of short duration and definite termination, while the so-called parasitic infections caused by protozoan and metazoan parasites are as a rule of slow course, afebrile and of uncertain duration. It has also been noted that if an acute bacterial infection accompanied by high fever should occur during the course of a parasitic infection, the parasites are not uncommonly discharged during the febrile stage of the disease. This suggests that the high temperature furnishes an unfavourable environment for the parasites. Extensive experiments with dogs were carried out and it was found that the application of heat in the form of colonic lavage with normal saline solution at a temperature of 45° C. to 47° C. for from ten to fifteen minutes produced no pathological symptoms in the intestinal mucosa, but in the case of one animal the lavage produced the discharge of large numbers of parasites from the bowel. The method was then applied to the treatment of parasitic and other intestinal infections in man. The day before treatment the patient takes a light supper and a purgative is given in the evening followed by an enema three hours before operation. The patient during the operation lies on the right side with the hip slightly elevated. A thermometer is introduced about ten centimetres (four inches) into the rectum. The receptacle containing the hot saline solution is suspended about one hundred and twenty to one hundred and fifty centimetres (four to five feet) above the table and the rectal tube is introduced into the first five to seven and a half centimetres (two or three inches) of rectum. The hot saline solution is slowly injected and the rectal tube gradually introduced further into the rectum, the sigmoid colon, the splenic flexion and even further. The temperature in the rectum is carefully watched and should not exceed 47° C.. The amount of fluid injected depends on the reaction of the patient, but usually five hundred cubic centimetres can be introduced. The efficacy of the test depends on the maintenance of the temperature in the colon for five to fifteen minutes. In the writer's experience the cure of amœbic dysentery is accomplished in from one to three weeks by the application of four to ten treatments, lavage being applied every other day or once a week according to the severity of the condition. For the removal of other parasites a single application usually suffices. The method as applied to the small bowel consists in the introduction of the hot saline solution by a duodenal tube through the mouth. When the duodenum is reached sixty to ninety cubic centimetres (two to three ounces) of a warm 30% solution of magnesium sulphate are introduced. This produces an active peristalsis and following this five hundred cubic centimetres of hot saline solution are introduced through the tube. A few minutes later a second application of the magnesium sulphate is made and the operation repeated until fifteen hundred to two thousand cubic centimetres of hot saline solution have been passed into the intestinal tract.

The Potency of Stored Vaccine.

LUCY MISHULOW, CAROLYN OLDENBUSCH AND MARIE SCHOLL (*The Journal of Infectious Diseases*, August, 1927) have investigated certain aspects of the storage of vaccines, using pertussis vaccine in the experiments carried out. The investigations extended over a period of five and a half years. Rabbits were injected intravenously with the different preparations of the vaccine and seven days after the final injection were bled and their serum tested for agglutinins and complement fixing antibodies. The following observations were made: Pertussis vaccines prepared in salt solution, heated at 53° C. for one hour, containing 0·3% phenol, were found to retain their potency for a period of four and a half to five and a half years when stored at 8° to 10° C.. When stored without preservatives, such vaccines deteriorated more rapidly than either the heated vaccine *plus* preservative or the unheated vaccine. Vaccines prepared with a recently isolated strain of pertussis showed no greater antigenic power than vaccines prepared with an old laboratory stock strain. Glycerol preparations of both the old stock strain and the recently isolated strain showed no appreciable deterioration after a period of four and a half years. Vaccines grown on chocolate agar did not differ in potency from those that were grown on Bordet-Gengou medium.

Standard Antigen for the Kahn Test.

R. L. KAHN, NATHAN NAGLE AND PEARL L. KENDRICK (*The Journal of Infectious Diseases*, August, 1927) discuss the problem of uniformity of antigen in the Kahn test and suggest means of overcoming the differences in sensitiveness which are encountered in the preparation of successive antigens. The authors claim that if the antigen is prepared according to Kahn's method, it is possible to correct it to a degree of sensitiveness uniform with a standard. They strongly emphasize the importance of using syphilitic serum, which gives a weak response in testing variation of sensitiveness between different batches of antigen. The variations in sensitiveness depend, in part at least, on differences in the degree of autodigestion of the beef heart used, leading to varying concentration of lipoid substances in the antigen. Details for standardization are given, an antigen too rich in beef heart extractives being made standard by dilution with alcohol and one not rich enough being made standard by the addition of a titrated amount of extractives. It is stated that antigens, once standardized, keep for at least three years and probably indefinitely.

Experimental Pneumococcal Septicæmia.

HEDLEY D. WRIGHT (*Journal of Pathology and Bacteriology*, April, 1927) gives an account of experiments made with a view to the determination of the capacity of the rabbit for disposing of pneumococci (Type I) injected into the blood stream and the effect of immunization upon this capacity and the mechanism by which this disposal is effected. Rabbits were used throughout the experiments. The inoculum was a measured amount of a twenty-four hours culture of a strain of Type I pneumococcus in broth containing 10% to 20% rabbit serum. In normal rabbits it was found that a preliminary period of removal of organisms injected into the blood stream occurred lasting about five hours. This was followed by a period in which the bacteria in the blood stream increased in numbers. A final period was noted during which gradual disappearance of the organisms from the circulation occurred. Removal of the organisms was usually complete in from four to six days. If the rabbit is given a second intravenous injection of pneumococci immediately after the complete removal of a similar dose of organisms from the blood stream has occurred, the preliminary rate of removal is increased and subsequent reappearance of the organisms in the blood does not occur. An avirulent strain of pneumococci is removed from the blood stream far more rapidly and completely than a virulent one. The improvement in capacity to remove organisms from the blood stream can be conferred passively upon a normal rabbit by injections of serum from a previously treated rabbit. The author suggests that part of the mechanism of removal of organisms from the circulation consists in the production of an increased adhesiveness of the bacteria as a result of which they tend to stick to one another, to the leucocytes, to endothelial cells and to platelets. Active phagocytosis by polymorphonuclear cells and mononuclear cells of the blood and cells lining the endothelial sinuses of the liver and possibly of the spleen also occurs. So far as the pneumococcus is concerned, the factor influencing the rate of removal

most effectively is the process of specific immunization. The production of agglutinins, opsonins, precipitins and complement-fixing antibodies does not appear to be essential to the process of immunization. The author also suggests that the measurement of the septicæmia is a measurement, not of the actual amount of growth which occurs in the inoculated organisms, but of the balance between growth and elimination. The rate of growth in the blood stream even during the period of increase is rarely if ever the same as in blood in the test tube.

Complement Fixation and Entamœba Histolytica.

CHARLES F. CRAIG (*American Journal of Tropical Medicine*, January, 1928) describes the results obtained with the complement fixation test in infections with *Entamœba histolytica*. The antigens used in the tests were prepared by extracting forty-eight hour old cultures of *Entamœba histolytica* with absolute alcohol. The sediment of sixty to eighty cultures of the amœba, grown on Boeck-Drbohlav mœdium, was mixed with seven to ten parts of absolute alcohol and incubated at 37° C. for ten days, being thoroughly shaken several times a day during the period. The mixture was then filtered and used as antigen. Over three hundred specimens of blood serum were tested and in two hundred and twenty-five of the cases the fæces were also examined. Of the two hundred and twenty-five individuals twenty-six yielded a reaction with the complement fixation test, while one hundred and ninety-nine failed to yield a reaction. The results were very clear as to presence or absence of reaction and no partial reactions were noted. Of the twenty-six patients whose serum yielded reactions, twenty-four or 92·3% harboured *Entamœba histolytica* in the fæces. Of the patients in whose serum no reaction could be demonstrated, two yielded *Entamœba histolytica* in the fæces (1%). With treatment of the infection the reaction disappears and individuals free of infection do not yield a reaction. No reaction is obtained with the serum of individuals infected with *Entamœba coli*, *Entamœba nana*, *Iodamœba*, *Trichomonas hominis* or *Chilomastix*. The reaction occurs in "carriers" who present no symptoms.

HYGIENE.

Effective Temperature Index.

C. P. YAGLOU (*The Journal of Industrial Hygiene*, July, 1927) after ascertaining what combinations of temperature, humidity and air movement produced sensations of equal warmth, evaluated these combinations in a single index called the "effective temperature index." Effective temperature is not a temperature in itself which like dry or wet bulb temperatures can be measured by ordinary thermometers; it is an arbitrary index of the sensation of warmth experienced as the result of temperature, humidity and air motion; it combines these three factors into a single value. The Pittsburgh laboratory has developed two separate and distinct effective temperature scales. The first or basic scale was determined by subjects stripped to the waist and applies to hot industries. The second or normal scale is of more practical importance because it applies to men normally clothed. In industrial establishments where temperature is an important factor, it is advisable to judge the working conditions in terms of effective temperature. Effective temperature can be computed from dry and wet bulb temperatures and from the velocity of the air; it is the most exact index yet devised for evaluating the thermal condition of the atmosphere. All measurable physiological effects of the physical environment for men at rest and at work are well correlated with this index. Even when profuse perspiration comes into play, effective temperature continues to be a more accurate index than wet bulb temperature. Under special conditions and within narrow limits, the kata-thermometer constitutes a fair index of the thermal conditions of the atmosphere, although it requires empirical graduation. In most instances, however, its thermal properties differ so much from those of the human body that it is doubtful whether it can be compared in accuracy with the effective temperature index. For the average American sedentary worker, an effective temperature of 18·8° C. (66° F.) on the basic scale proves most satisfactory. This value varies, however, to some extent with the season. In hot industries where light work is being carried on, the upper limit of a man's ability to compensate for external temperature is an effective temperature of about 32° C. (90° F.); in occupations involving hard manual labour the limit is about 27·8° C. (80° F.). Provided the effective temperature is below 37·2° C. (99° F.), the atmospheric conditions in hot industries can be improved by increasing the velocity of the air and by reducing the amount of clothing worn. Cooling the air by means of adiabatic saturation is also advantageous in industries where the temperature is very high and the humidity is low. These are the simplest and most economical methods available. If they fail to produce the desired improvement resort must be had to refrigeration.

Wet Kata—Cooling Power.

H. M. VERNON (*The Journal of Industrial Hygiene*, July, 1927) in a previous article endeavoured to show that for most purposes the cooling power of the air as estimated by the dry kata-thermometer affords a better index of comfortable sensations than does the effective temperature as estimated by the two-chamber method (Pittsburgh). As a result of systematic observations on colliers in various working places in two pits, Vernon concludes that effective temperature is still less suitable as an index of effort for persons engaged in heavy work at high temperatures. For this the wet kata-cooling power is found to be a far better index of the suitability of atmospheric conditions. It is true that effective temperature is stated to be an index of warmth rather than of the suitability of working conditions. No object is gained in knowing the sensations of a man if they are not reflected in his capicity for work. Such evidence as is available indicates that it is an erroneous principle to condition the air of a mine by increasing its relative humidity and lowering its dry bulb temperature while leaving the wet bulb temperature unchanged. Air that is cooler but more humid, if of a lower effective temperature, appears to be much more trying to work in than air that is warmer and less humid.

Country Tuberculosis Schemes.

G. L. COX (*The Journal of State Medicine*, June 1927) considers that a tuberculosis scheme to be complete should deal with pulmonary tuberculosis in children and adults, non-pulmonary tuberculosis in children and adults and tuberculosis in cattle. With respect to tuberculosis in animals, if public opinion can be sufficiently aroused to insist on measures to reduce the 2% or thereabouts of cattle with tuberculosis of the udder, very many children will be saved from crippling disease. Schemes concerning human tuberculosis may be dealt with under the headings of the tuberculosis officer, the extent and size of the area of a county and its population, the dispensary organization, including dispensary treatment, supervision of home treatment and care work, provision of institutional accommodation for treatment and isolation which will include accommodation for children and adults with early and late pulmonary tuberculosis and accommodation in tuberculosis settlement, the cost of a tuberculosis scheme and housing, employment and education. The success of any scheme depends ultimately upon the tuberculosis officer appointed. It is essential that he is a really good clinician and looked upon as a consultant by the doctors in general practice, but having administrative ability and a public health outlook. In population the minimum number for a single whole-time tuberculosis specialist should be about 150,000. The dispensary organization, consisting of a tuberculosis officer, nurses or health visitors, the dispensary clerk and dispensary building, should have as its functions the diagnosis of the condition of patients or the contacts of patients and the determination as to forms of treatment, the supervision of home treatment including general hygienic precautions as to spread of infection, the keeping of records and information of all kinds and keeping in touch with the local care committee and in country areas, the local sanitary authorities. In Lancashire the dispensary units are five in num-

ber with an average population of 350,000. Each area is under the charge of a consultant tuberculosis officer having a chief dispensary with an office, clerical staff, X ray room and laboratory. Throughout the unit there are two, three or more branch dispensaries. To assist the consultant tuberculosis officer there are in these large dispensary units one or more assistant tuberculosis officers and in each unit six tuberculosis nurses. In Lancashire the tuberculosis scheme costs about £178,000 for a population of 1,750,000.

The Effects of Noise on Working Efficiency.

DONALD A. LAIRD (*The Journal of Industrial Hygiene*, October, 1927) states that it has long been recognized that quiet conditions are important to hospital patients, partly because of their apparent effects on the convalescence and partly because they remove irritating stimuli from those who have been made especially irascible by physical ailments. Aural disorders have been attributed in some instances to exposure to continued noises of high intensity, but just what effects the increasing noises of modern machine civilization have on the workers in the normal course of the day's work has been largely a matter of conjecture. The actual effect of noise on output and energy consumption of typists was measured in the Colgate laboratory from September, 1926, until March, 1927. In these experiments energy expenditure was measured by the collection and analysis of exhaled air. A gas mask was strapped to the subject's face and connected to the adjoining rooms with a system of tubing. From the analyses the total calories expended were computed. The typist worked in a specially prepared test chamber. A noise machine was built to reproduce the sounds occurring in the usual busy office. During all days on which the experiments were carried out, the machine was in full blast. In half of these days the sound intensity was reduced by 50% through the use of panels of acousti-celotex. During the noisy phase the test chamber was no noisier than many offices. Experienced typists were experimented upon, the subjects being equally divided between the sexes. The average increase of the working metabolism over the resting metabolism was 52% when the noise was deadened by the acousti-celotex panels, as contrasted with an increase of 71% when the noise was not quieted. Thus there was 19% more energy consumed by the typist when working under the noisy conditions. The average time for typing a letter under the noisy conditions was 162 seconds as compared with 155 seconds when the noise was reduced, representing an average gain in speed of 4·3% under the quieter conditions. The time for removing a completed letter and inserting a new letter was a second and a half faster under the quieted conditions. There was no difference between the two conditions as regards the number of errors in typing. Under noisy conditions there is no apparent warming up and each succeeding letter takes a little more time than the one before it; while under the quieted conditions a slight amount of speed is actually gained in each succeeding letter. The energy expenditure differences between the noisy and quieted conditions were the same after the first fifteen minutes of work as they were after two hours of intensive work.

Blood Changes in Lead Workers.

B. KOGAN AND L. SMIRNOWA (*The Journal of Industrial Hygiene*, October, 1927) investigated the blood conditions of three hundred and eighty-one workers, one hundred and thirty-two of whom came in contact with lead. The hæmoglobin determination was done with the Sahli-Bervald hæmometer; the smears were fixed for three minutes in methyl alcohol and were then put into Giemsa's stain for five minutes (1% solution: one drop to one cubic centimetre of distilled water). For the count of basophilic granular erythrocytes the smears were placed for five minutes in an aqueous solution of methylene blue (1% solution: one drop to one cubic centimetre of distilled water); for the thick drop of blood an aqueous solution of methylene blue and carbol fuchsin was used (five drops of methylene blue to ten cubic centimetres of distilled water and four drops of carbol fuchsin). The count was made from the thin smears; an ocular Zeiss lens was used, each microscopical field being considered as covering three hundred erythrocytes. The following conclusions were drawn: Basophilic granular erythrocytes are elements of the embryonic blood; their appearance in the peripheral blood denotes a pathological condition of the blood, as they are results of pathological regeneration (of embryonic type). Basophilic granules may be found in the peripheral blood under the influence of lead as well as in anæmias which are not caused by lead. Basophilic granular erythrocytes appear in the blood of workmen in the lead industries even before the onset of anæmia, when the percentage of hæmoglobin is still high, as an early reaction of the organism to the influence of lead. Basophilic granules appear only in rare cases in the blood of workmen who do not come in contact with lead, and then they always accompany a severe anæmia (primary or secondary). Thus the appearance of basophilic granules must be regarded as "practically specific" for workmen in the lead industries. Basophilic granules are evidently connected with the period of entrance and circulation of the lead in the blood, and not with its presence in the places where it is usually deposited (liver and bones). The anæmia that usually developes in a workman in the lead industry, if it is caused exclusively or largely by the action of lead, disappears very quickly after the workman is removed from the industry or after he stops working with lead. One of the most frequent diseases among workmen in the lead industries is anæmia. The appearance of basophilic granules in the erythrocytes is closely connected with the time when the nucleus is lost by the erythrocytes. The *substantia reticulo-filamentosa* of the erythrocytes is clearly to be distinguished when the smear is stained by the vital method; it is of lipoid origin and can be made clearly visible on dry, unfixed smears when they are treated with aqueous solutions of stains. Basophilic granules are of nuclear origin. Polychromatophilia is of protoplasmic origin and can be regarded as evidence of the young form. Following the injection of small doses of lead into guinea pigs pathological forms appear in greater numbers, a characteristic which proves a very good regenerative power of the blood. When large doses of lead are used, there may be a small number of pathological forms in the blood; this characteristic proves a poor regenerative power of the blood and may lead to the death of the animal. The scheme offered by Schmidt has not sufficient scientific foundation and is useless for practical application, for in each individual case the question of removal of the workman from the industry must be decided by consideration of the general condition of his organism.

The Trend of Occupational Mortality in the United States.

FRANK G. PEDLEY (*The Journal of Industrial Hygiene*, November, 1927) discusses the trend of mortality among occupied persons in the United States and attempts to show that occupied persons have shared with the general population in the advantages and disadvantages of the shifting death rates. It has been felt in the United States that if occupational death rates were to be published, they would be more misleading than helpful, since no accurate record of the number of persons engaged in the various occupations is available, since it is impossible to be sure that the occupation at death was the one pursued during the greater part of the worker's life time, and since a person may be recorded as unoccupied at death and yet may have pursued some definite occupation during the greater part of his lifetime. The author adopted the device of proportionate mortality in order to compare occupations with each other. By this method calculation is made of what percentage the deaths of each disease or group of diseases are to the total deaths, but the obvious fallacies in this procedure are given. From a study of the figures published in the tables, it is evident that the conception of industrial mortality must change somewhat. The prevailing idea that tuberculosis is still the leading cause of death among industrial workers and that it has taken third or fourth place as a cause of death in the general population, is apparently incorrect. Tuberculosis is

still excessive in industry as compared with the country as a whole, but it is now surpassed in importance by cardiac diseases. No longer is tuberculosis the "captain of the men of death." This study does not support the idea that the increase in cancer is due to increasing industrialization. Indeed the relative proportion of cancer among occupied persons is actually less than among the unoccupied. This, of course, may be accounted for if it is supposed that a number of cancer patients stop work some time before death and are recorded on the death certificates as unoccupied. The increase in proportionate mortality from cancer among occupied persons, however, is no greater than that among the general population. The reason for the increase in proportionate mortality from heart disease is due, not so much to an actual increase in deaths from the disease, as to a decrease in death from other diseases, chiefly tuberculosis. The death rate from heart disease has increased somewhat in the general population, but not to the extent suggested by the increase in proportionate mortality. The age distribution of deaths from tuberculosis and heart disease for occupied persons in the United States in 1909 and 1920 is given in two charts. These charts are of interest in showing that there has been a shifting in deaths from these diseases to the later years. Apoplexy and paralysis and the chronic disease of the kidneys show very little change in their proportionate mortality among occupied persons in the last decade, nor do they show much change in the general population. If hidden foci of infection are responsible in part for the occurrence of these diseases, the active crusade directed toward the elimination of these foci should soon be reflected in the mortality records.

Sex Differences in Pulmonary Tuberculosis Deaths.

PERSIS PUTNAM (*The American Journal of Hygiene*, November, 1927) in order to determine the nature and cause of sex differences occurring in deaths from pulmonary tuberculosis, made a statistical analysis of mortality and population data by sex, age and census year for the United States registration States of 1900 and the District of Columbia for the period 1870-1900. He has found that sex differences at ages under twenty-five arise primarily from biological differences between the sexes in their reaction to tuberculosis, which seem to be associated with physiological changes occurring at puberty and adolescence. This conclusion has been drawn from the fact that sex differences at these ages are persistent over the fifty years, are not associated with fundamental differences in environment and show an excess of female over male deaths during ages of physiological development. The growth in environmental sex differences, resulting in a greater wear and tear upon the physical resistance of the man than of the woman, is believed to be the determining factor in sex differences arising from the lag in the decline of male mortality during middle adult life. The decline in tuberculosis prevalence at every age group is believed to be associated primarily with such factors as improvement in general hygiene, in social and economic status and others of environmental origin which are part and parcel of the progress of man's civilization. The basis for this belief lies in the fact that during the years 1870-1920 the rates of decline of the death ratios are constant, that they are alike for males and females at ages when living conditions are essentially similar, but differ at ages when environmental hazards are greater for men than for women.

The Trend of Enteric Fever Mortality.

PERSIS PUTNAM (*The American Journal of Hygiene*, November, 1927) states that data covering a number of years from the same area are needed for an analysis of the trend of any death rate. It is not only necessary to know when big movements in sanitation are made; it must also be known what the trend of mortality was before this movement was commenced. Unfortunately, this is the kind of information most difficult to secure. Records for the United States as a whole do not exist, as a number of States are still not included in the registration area for deaths. The only large geographical unit which may be used for any length of time, comprises the registration States of 1900 and the District of Columbia. In the present study the enteric fever rates of this area for the years 1900-1925 have been used and their trends analysed. The results of this analysis are summarized as follows: The trend of enteric fever mortality in certain large American cities was constantly downward during the latter part of the nineteenth century. The slope of the trend increased about the beginning of the twentieth century and this accelerated rate of decline has been constant up to the present time. The experience in the registration States of 1900 from 1900-1925 has been similar to that found in the cities. An increase in variability has appeared in almost all of the records during the last few years. This increase in variability may be due simply to the reduction of the total mass of deaths with which the individual deviations are compared or it may be due to an impending change in the direction of the trend of the rate, perhaps to one having a less rapid rate of decline. These findings are significant to the public health officer. They show, in the first place, that the present sanitary programme has been successful in reducing enteric fever mortality in communities where it has been carried out. The results of a recent study of Alabama communities suggest, however, that the sanitary conditions in small towns are still far from satisfactory. These writers found a distinct fall in both incidence and death rates as the population of the incorporated areas increased. If these findings are characteristic of other States, an immediate problem of the health officer would appear to be the better sanitation of the small town. Rural enteric fever offers a fruitful field for study, as under such isolated and simple living conditions modes of transmission may be more easily traced. In larger communities, where sanitary measures have been successfully carried out, special studies should be made of all outbreaks to determine their source and mode of spread, since it may be only by devising new methods of attack that it will be possible to maintain the present rate of decrease of the death rate. Carriers should be identified and every effort made to keep them from infecting other people. This involves keeping them out of occupations where contamination of water or food products is a possibility. The question of a possible method of sterilizing carriers requires further investigation. So far attempts to do this have met with little success.

A Milk-borne Epidemic of Poliomyelitis.

W. L. AYCOCK (*The American Journal of Hygiene*, November, 1927) reports an epidemic of poliomyelitis of unusual severity occurring in Broadstairs, England, a city of 15,471 population, in October, 1926. During the five years previous to this epidemic only two cases of poliomyelitis had been reported in Broadstairs. This outbreak started and subsided suddenly, sixty-two cases being reported between October 14 and 29; thirty-one of them on October 14 and the five days following. Other prominent features were the facts that multiple cases occurred in private boarding schools having little communication with the town or with each other and that only the well-to-do class of the population was affected. Moreover, the epidemic was confined strictly to Broadstairs and did not extend to either Margate on the north or Ramsgate on the south, adjacent cities of 30,000 and 40,000 respectively. In addition three visitors who had left Broadstairs, just previous to the outbreak, developed the disease during the height of the epidemic. The distribution of cases indicates that the majority were simultaneously infected. The data concerning the three persons who left Broadstairs before the epidemic, fix with a high degree of probability a definite period of infection from which it may be inferred that the incubation period was in the majority of cases between six and fourteen days. The evidence concerning the milk supply points strongly to the milk furnished by one dealer as being the common source of infection, as all of the patients were supplied with milk from this dealer. It would further appear that only one grade of this milk which came from a single farm was responsible for the epidemic.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Darling Building, University of Adelaide, on February 23, 1928, DR. R. H. PULLEINE, the President, in the chair.

Treatment of Syphilis.

DR. GLEN H. BURNELL read a paper entitled: "The Management of Syphilis" (see page 395).

DR. R. F. MATTERS read a paper entitled: "Syphilis in Women and Children" (see page 398).

DR. R. V. STORER gave an account of the various preparations used in the treatment of syphilis.

Syphilitic Lesions Found at Post Mortem Examinations.

PROFESSOR J. BURTON CLELAND read a paper entitled: "Syphilitic Lesions as Met With at Post Mortem Examinations" (see page 399).

Gumma of the Thigh.

DR. I. B. JOSE showed a male, aged fifty-seven years, whom he had seen first in November, 1925. For a year before that he had complained of stiffness in the left hip and of pain in the hip and knee, of gradual onset. He had been laid up in bed for seven months and then had been getting about for five months and evidently had been regarded as suffering from osteoarthritis of the hip. When first seen he had had an indurated mass chiefly in the *vastus externus* muscle, extending from the iliac crest to just above the knee. This he said had been present and increasing for six months. Limitation of movement and pain in the hip had also been present. Dr. Jose had considered that the diagnosis at that time had to be made between a sarcoma or a chronic inflammatory mass due to syphilis. A Wassermann test had yielded no reaction and a similar finding had been obtained on several occasions since. The Kahn test had also been used without a reaction being obtained. An X ray examination of the hip had revealed absorption of the articular cartilage, a fluffy but dense appearance of the bone of the neck and upper end of the femur, consistent with a gummatous infiltration. The condition had certainly not been a neoplasm and a partial pathological fracture of the neck of the femur had been present. He had been put to bed, but a few days later severe pain and shortening in the leg had shown that the neck of the femur had given way. The patient had been given a course of seven injections of "Novarsenobillon," each dose being 0·75 gramme. The mass in the leg had at once begun to decrease in size. At its upper end a small portion had softened, pointed and discharged with all the appearances of a gumma and then healed without alteration of treatment. A second course of "Novarsenobillon" had been given in May, 1926. Mercury and potassium iodide had also been administered from the beginning of treatment to the time of showing. During this time the gumma had softened and discharged a few times at the same small area at the upper end and the induration in the leg had progressively and completely disappeared. The fractured neck of the femur had not united by bony union and there was a little shortening in the leg. This had necessitated the wearing of a calliper which enabled him to get about quite well. His general health had been much improved by the treatment, but he showed the ravages of the spirochætal toxin in that he was halt, his sight was deficient and he was very deaf.

Gumma of the Tibia.

Dr. Jose also showed a youth, aged eighteen years, who had come to him in March, 1927, with an ulcer on the middle of the right lower leg. This had been present for five months and had followed a knock. It had been a typical syphilitic ulcer in regard to its site, its punched-out edge and its serpiginous outline and it had been surrounded by thin pigmented scars of healed ulcers. The Wassermann test and a Kahn test had been used on several occasions, but no reaction had been obtained to either. X ray examination had revealed a chronic osteitis and periostitis in the back of the upper end of the tibia. The condition was evidently a gumma. A course of "Novarsenobillon" had been given, with mercury and potassium iodide by mouth, followed by a long course of intramuscular injections of "Bicreol." The ulcer had healed up, though slowly and since then antisyphilitic treatment had been continued. No evidence of primary infection had been obtained, possibly the condition was congenital.

Dr. Jose pointed out that in both these cases of late tertiary syphilis no reaction was obtained to the Wassermann test; this was not unusual. The condition had to be diagnosed on the clinical appearance alone and the diagnosis had been confirmed by the results of treatment.

Pleurisy.

DR. F. S. HONE showed three patients suffering from pleurisy who had recently been in his wards, to exemplify the fact that pleurisy is only a symptom, the primary cause for which should always be sought and also that blood in the aspirated fluid is so frequently an evidence of neoplasm in the chest.

H.B., aged twenty-nine years, labourer, had been admitted to the surgical ward on January 19, 1928, for operative treatment to relieve a right inguinal hernia of four months' duration and attacks of right-sided abdominal pain of six months' duration, which had been diagnosed as "chronic appendicitis." The operation, performed the same day, had revealed an appendix 7·5 centimetres (three inches) long with little departure from normal appearance macroscopically. Ten days after the operation when his wound had quite healed, the patient had complained of pain in the right side of chest, worse on deep breathing and coughing; pyrexia had been present. A soft friction rub had been heard on examination. Pyrexia had continued and signs of fluid at the base of the right lung had gradually increased, so that after five days (February 3, 1928) he had been transferred to Dr. Hone's ward. Next day his temperature had come down to normal, but signs of fluid had remained stationary over the lower half of the right lung for the next five days. A needle had been inserted and about ten cubic centimetres of greenish serous fluid drained off for investigation. On microscopical examination this had manifested many endothelial cells and lymphocytes. No tubercle bacilli or other organisms could be seen and there had been no growth on culture media inoculated. The signs of fluid had gradually diminished and the patient's general condition had improved, except for some complaint of pain in the left side of the chest on February 15. No abnormal signs could be found.

Dr. Hone said that pleurisy, either serous or purulent, fairly often followed on appendicitis attacks and might not show its presence until after the operation for the original trouble. It was more usual, however, after cases with pus formation and in this instance the absence of any macroscopical evidence of a diseased appendix at the operation was against any such causal relation. This raised the question whether the pleurisy was not of tuberculous origin, stirred up by the anæsthetic or operative procedures. An X ray picture of the chest had therefore been taken on February 16 and had shown beside the shadow of the effusion still present, increased opacities throughout both lung fields, particularly on the right side. This might be chronic peribronchial thickening or tuberculous in origin. After treatment should therefore be on the lines of mild tuberculous infection.

Mrs. B., aged sixty-three years, had been admitted to the ward on January 21, 1928, complaining of a pain in the right side of the chest which had occurred suddenly fourteen days previously. It had been no worse on deep breathing or coughing. It had been accompanied by loose cough. Neither hæmoptysis, night sweats, nor shortness of breath had been present. She had been losing a considerable amount of weight lately, but nothing else of importance had been elicited in her personal or family history. There had been slight pyrexia when she was

admitted and a rapidity of pulse, greater than would be expected with the slight rise of temperature. She had been somewhat cachectic. There had been signs of fluid in the left side of the chest half way up the scapula behind. A dull percussion note had been present above this with long expiratory murmur and whispering pectoriloquy. The heart had been pushed outwards, the apex beat being in the fifth space in the anterior axillary line. No tubercle bacilli had been found in the sputum on more than one examination. Four days after admission 480 cubic centimetres (sixteen ounces) of slightly blood-stained fluid had been withdrawn from the chest. Microscopical examination of this had revealed the presence of much blood and no tubercle bacilli. There has been an irregular pyrexia since and signs of fluid had remained constant. One and a half litres (forty-eight ounces) of fluid had been drawn off on January 28 and 1,110 cubic centimetres (thirty-seven ounces) on February 16. Although the fluid drawn on the second aspiration had not been blood stained, the presence of blood in the first specimen again suggested a neoplasm as the cause of the pleurisy and this was confirmed by X ray examination in a very striking way.

E.S., aged sixty-five years, a labourer, had been admitted to the ward on December 28, 1927, complaining of swelling and pain in the joints. The attack had come on six weeks previous to admission, beginning in the right foot which became hot and painful, and followed by pain in back of neck. Three weeks later pain and swelling in both wrists had occurred. There had been no previous sore throat and no history of gonorrhœa, but he had had an attack of "rheumatism" four years previously which had kept him in bed for a month.

The joints had been quite well in the interval. He was a single man and had been a heavy drinker and had worked in a country hotel till six weeks before admission. The history also showed that he had been short of breath for a few weeks before admission.

Examination on admission had revealed a subacute arthritis in the left knee and wrists which was subsiding. He had had no articular trouble since a few days after admission. No tophi had been found, but his blood uric acid content six weeks after his attack had been 4·1 milligrammes per 100 cubic centimetres, which was well above normal. There was no evidence of any old cardiac involvement. His urine had contained no albumin at any time and blood pressure was normal. Examination on admission had also revealed signs of fluid at the base of the left side of the chest extending half way to the spine of the scapula posteriorly. On January 1 a needle had been inserted into the chest and ten cubic centimetres of slightly blood-stained fluid withdrawn.

Dr. Hone said that pleurisy with effusion followed both rheumatic fever and gout. In this case, however, the blood-stained fluid pointed to a more serious condition and the continuance of a slight evening pyrexia for three weeks, with occasional remissions since, suggested the continuance of a condition independent of his arthritis. The results of examination of the fluid were against a tuberculous infection and the presence of blood-stained fluid always raised suspicions of a neoplasm within the chest. This was strengthened by the continuance of the signs of fluid and by the fact that further aspiration of the chest on January 12 and February 16 revealed the same blood-stained fluid. The Wassermann test applied to the blood had yielded no reaction. X ray examination of the chest on January 5 had revealed in addition to the shadow of the effusion glandular enlargement in both hila and opacities scattered throughout both lung fields, which might be either tuberculous or malignant invasion. A skiagram taken on February 20 gave the same appearance. This taken in conjunction with the history and nature of fluid left little doubt as to the presence of a neoplasm in the chest. An interesting feature in this case was a hyperæsthesia of the skin of the left side, extending over the area supplied by all the thoracic nerves. The hyperæsthesia did not extend into the area supplied by the right thoracic nerves but to those supplied by other nerves. It was present in that area of the arm supplied by the second thoracic. This suggested some involvement of the spinal meninges or nerve roots.

Carbon Dioxide Administration.

DR. GILBERT BROWN demonstrated a simple portable apparatus for the administration of carbon dioxide, devised by Dr. Whitridge Davies in collaboration with Professor Briggs, of Edinburgh.

The apparatus consisted of a hollow metal cylinder to contain a "J" size "Sparklet" bulb; this holder screwed on to an upper portion which had a perforator and a fine adjustment valve. The bulb contained twenty-five grammes of liquid carbon dioxide which would provide approximately twelve litres of the gas.

The inhalation of air mixed with 5% of carbon dioxide promptly resulted in an increase of 300% to 400% above normal pulmonary ventilation. This fact had been taken advantage of in several types of reviving apparatus and used in cases of carbon monoxide poisoning and electrical shock. It had also been used in connexion with anæsthesia to obtain the more rapid absorption and elimination of volatile substances. The greatly increased amount of air breathed acted as a larger vehicle for the conveyance of normal or even increased amounts of ether to the lungs at concentrations much lower than those which produced laryngeal spasm or pulmonary irritation.

Dr. Brown had used the apparatus in the induction of anæsthesia on over eighty patients with very interesting results both as to rapidity of obtaining full surgical anæsthesia and the decreased amount of anæsthetic required. With ethyl chloride and ether sequence by the open method there was usually full anæsthesia in three minutes. One case related was that of a woman who had been anæsthetized in two minutes and forty-five seconds, then an endotracheal catheter had been passed and connected to Mott's apparatus and the patient had been ready for the surgeon in a total time of four minutes forty-five seconds. For the induction only five cubic centimetres of ethyl chloride and fifteen cubic centimetres of ether were required.

The apparatus was a great help with heavy smokers, alcoholics, shallow breathers or in case of a very irritable pharynx. Good results had also been obtained in a case of respiratory arrest and in the more rapid deetherization at the end of an operation.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Bennett, Frederick John, M.B., B.S., 1926 (Univ. Melbourne), Auburn.

Scott, Rutherford Kaye, M.B., B.S., 1927 (Univ. Melbourne), Malvern.

Box, William Mitchell, M.B., B.S., 1927 (Univ. Melbourne), Melbourne Hospital.

The College of Surgeons of Australasia.

THE Council of the College of Surgeons of Australasia met in Melbourne on January 26, 1928.

The death of E. H. Binney, a Foundation Fellow in New South Wales was reported and deep regret was expressed.

The amended by-laws, reported in the journal of October 15, 1927 (page 555) received some further amendments on the advice of the Honorary Solicitor and were finally passed by the Council for approval by the Fellows at the first annual meeting in Canberra on March 31, 1928.

The drafting of regulations by the Council and their revision by the Honorary Solicitor were completed. The regulations will be published at the first annual meeting.

As now finally amended by the Council a resolution included in the previous document was elided:

> That no applicant engaged in general practice in a capital city should be eligible as a Fellow.

It was determined that when the present stock of forms of application for Fellowship was exhausted, a form revised by the Honorary Solicitor would be put into use. The universities of Australia and New Zealand were being invited to send representatives to the first annual meeting of the College in March.

The Executive Committee was authorized to make all arrangements necessary for the publication of the proceedings of the first annual meeting and other suitable matter as the first issue of *The Journal of the College of Surgeons of Australasia*.

It was decided not to publish at present in the lay press an article on the College.

Forty-seven Fellows were elected. The Royal Colleges of England, Ireland and Edinburgh were to be officially notified of the formation of the College and of its aims and objects and the Honorary Secretary was instructed to write to the Royal College of Surgeons of England supporting the proposal to hold the primary examination for the Fellowship of that College in the States of the Commonwealth of Australia and in the Dominion of New Zealand.

The next meeting of the Council will be held at Canberra early in the forenoon of March 31, 1928.

Correspondence.

THE COLLEGE OF SURGEONS OF AUSTRALASIA.

SIR: It appears to be a very general impression that no surgeon who does general practice is eligible for admission to the Fellowship of the College of Surgeons of Australasia. This impression is quite incorrect. There is nothing in the exordium, constitution, by laws or regulations of the College to that effect. A fair proportion of the surgeons already admitted as Fellows of the College do some general practice. The impression has apparently arisen because, as reported in THE MEDICAL JOURNAL OF AUSTRALIA, at the meeting of the Council of the College held in Sydney in September, 1927, a resolution was passed that in capital cities no one doing general practice should be eligible for the Fellowship.

When the President of the College returned to Melbourne, representations were made to him and brought to the notice of the Executive Committee, in consequence of which the Executive Committee placed on the agenda of the next meeting of the Council a motion that the resolution referred to should be rescinded. At the meeting of the Council, held in Melbourne in January, 1928, it was rescinded and was not included in certain regulations then adopted. A report of this meeting, however, has not yet appeared in THE MEDICAL JOURNAL OF AUSTRALIA and members of the profession who read the resolution in the journal, are not aware that it has been rescinded.

I would like to make it known that eligibility for the Fellowship of the College depends on the applicant satisfying the Credentials Committee and the Council that he has been adequately trained in surgery and is a competent and ethical surgeon.

Yours, etc.,

March 19, 1928. G. A. SYME.

Obituary.

ALEXANDER WELLESLEY FINCH NOYES.

ON FEBRUARY 16, 1928, Alexander Wellesley Finch Noyes closed his eyes for the last time on Melbourne and on the world. He was taken ill suddenly at the Melbourne Club and the end came swiftly. His familiar figure will be missed at the Club and in Collins Street; his genial smile and his friendly greeting have become a daily event for many. Everyone knew him, what he had achieved and how he had given his best endeavours to the community of his city for over a third of a century.

Alexander Wellesley Finch Noyes was born at Deniliquin, New South Wales, in 1862. At an early age he was taken to Melbourne. He attended the Melbourne Grammar School from 1876 to 1879 after having spent some years at smaller schools. In 1881 he entered the University of Melbourne as a medical student, but in the following year he travelled to England and joined the Medical School at Charing Cross Hospital, in the Strand, London. He worked hard and was eminently successful as a student. He won distinction as a medallist in pathology, in forensic medicine and in practical medicine and earned much popularity among his contemporaries as well as among his teachers. In 1885 he secured the diploma of licentiate of the Society of Apothecaries and in 1886 he passed the examination of the conjoined Board and obtained the diplomas of membership of the Royal College of Surgeons of England and licentiate of the Royal College of Physicians of London. Three years later he obtained the fellowship of the Royal College of Surgeons of Edinburgh. He was elected demonstrator of physiology at Charing Cross Hospital Medical School and later house physician. He spent a few years studying dermatology in England and on the Continent.

In 1890 he returned to Australia and on August 20, 1891, he secured the appointment of honorary surgeon to out-patients in the Skin Department at the Melbourne Hospital. He devoted the major part of his attention to dermatology and after much arduous work and diligent study he attained eminence in this branch of medical practice. His private practice grew rapidly and in the course of some years became very extensive. In October, 1902, he was appointed full honorary surgeon to out-patients at the Melbourne Hospital and in December, 1911, he secured the office of honorary dermatologist at the same institution. For several years he was lecturer in dermatology at the University of Melbourne and his little book, "Lectures on Dermatology," was in the hand of each medical student at some time during the curriculum.

As years passed he gave up some of his private practice and was elected Honorary Consulting Dermatologist at the Melbourne and at the Eye and Ear and the Children's Hospitals.

In 1890 he was elected a member of the Medical Society of Victoria and eight years later he became a member of the committee. His colleagues pressed him to accept the office of Honorary Librarian. He was fond of books and reading and took a very great interest in the development of the library. He held the position until December, 1915. By this time the Victorian Branch of the British Medical Association had become very closely allied with the Medical Society of Victoria and all office-bearers of the latter were *ipso facto* office-bearers of the former. When the first session of the Australasian Medical Congress (British Medical Association) was held in Melbourne in 1923, A. W. F. Noyes was appointed by his colleagues Honorary Secretary of the Section of Dermatology.

During the war years he joined the Australian Army Medical Corps Reserve and attained the rank of Major. He performed valuable home service and made one journey on a troopship to Egypt. His contributions to medical literature were not numerous, but from time to time he recorded the results of his pathological work and some of his clinical experiences in medical journals. At the congress referred to above he exhibited some very colourful negatives of *Mycosis fungoides* in which the characters of this disease were recorded in a remarkably life-like manner.

He was a keen sportsman. As a boy at school he gained the approval of his fellows as a rifle shot. He kept up his shooting until late in life. He was also an efficient polo player, but was compelled to give up this game as a very young man after a serious accident which rendered him unconscious for a fortnight. He also played golf and tennis. He was a thoughtful reader and had a retentive memory. Among his hobbies may be mentioned his love for astronomy. Apart from this subject his reading covered a wide range of matter. Few men knew

Alexander Wellesley Finch Noyes intimately, but those few valued his friendship. He was the essence of kindness and his consideration for others was great. The want of home life created in him a superficial enjoyment of the lighter side of recreation. But the more serious side of his nature was the more powerful and his professional and scientific attainments were never neglected. He was a sound and original thinker.

Sir George Syme writes:

I first met Alexander Wellesley Finch Noyes in 1882, when he was a dresser in the surgical wards of the Melbourne Hospital, of which I was in charge, as a resident surgeon. He was noticeable because he was always extremely well dressed, in the height of the prevailing fashion and also owing to some little peculiarities of manner after a severe head injury sustained when playing polo. These mannerisms became more pronounced. As a student he was also a noticeable figure at fashionable receptions and dances and quite a "society" man. Notwithstanding such distractions he was a very capable and hard-working student. In 1882 he went to London to continue his course there. He was a gold medallist at Charing Cross Hospital and after taking his M.R.C.S. (England) and L.R.C.P. (London) he held resident appointments and was demonstrator in physiology. He also worked at surgery and passed the examination for the F.R.C.S. (Edinburgh). He then took up the study of dermatology, working with Unna and other eminent specialists at various European clinics.

On his return to Melbourne he started practice as a dermatologist and was appointed to the Alfred Hospital in that capacity.

I then came to know him more intimately through our mutual association with Sir Thomas Fitzgerald, at whose residence we frequently met and played tennis. I soon learned to appreciate his sterling qualities which were apt to be overlooked by some owing to his mannerisms.

When working with Unna, Noyes had done some original work on the pathology of skin diseases and he continued these studies in Melbourne, one of his best known contributions being on neuromatosis. He was recognized by the University of Melbourne as clinical teacher in dermatology and generations of students owe to him their knowledge of skin diseases. He devoted a great deal of time and thought to his clinical demonstrations and was an excellent exponent of his subject, full, clear, exact and dogmatic.

He had a very deep, wide and scientific knowledge of skin diseases, especially of their pathology and diagnosis.

Besides holding a position at the Alfred Hospital Noyes had charge of the Skin Department at the Melbourne Hospital, for which, however, he had to be elected as Surgeon to Out-patients, as the by-laws of the hospital at that time did not provide for a dermatologist. For a time he took advantage of his being elected as surgeon to act as such, but soon reverted to the dermatological department. After his retirement he was appointed Consulting Dermatologist.

Noyes never married, but was a typical "man about town." He was always immaculate in his dress, lived at the Melbourne Club and spent his "hours of ease" in attending social functions and playing bridge and golf, but always keeping up his knowledge of his special subject.

"Alick" Noyes, as he was always called, was a genial, courtly gentleman, who will be much missed by a wide circle of friends.

ROBERT OLIVER DOUGLAS.

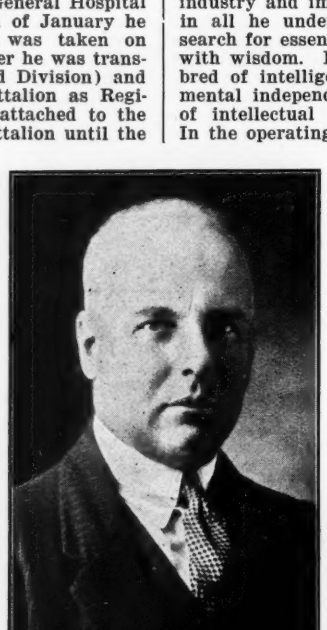
ON February 9, 1928, Robert Oliver Douglas was accidentally killed while driving a motor car along the Coleraine Road near Hamilton, Victoria. This accident brought to an end a life rich not only in achievement, but also in promise.

He was born on February 7, 1885, at Swinside, near Coleraine; he was therefore a native of the district in which he practised. His early boyhood was spent in the country. When he reached school age he attended the little bush school at Gritjurk, between Coleraine and Hamilton; later he went to Hamilton College. He matriculated from there in 1902 and entered the service of the Education Department of Victoria. The two following years he spent at Warrnambool on the staff of the State school. In 1905 he entered the Training College at the University and remained there for two years and, while in his second year at the College, he entered the Medical School. He gained first class honours in chemistry and biology. In the following year he returned to teaching; he joined the staff of the Brunswick State School. He resumed his medical course in 1908 and graduated in 1911. In his third year he obtained first class honours and an exhibition in anatomy, together with first class honours in physiology, being second on the list, Dr. C. H. Kellaway, now Director of the Walter and Eliza Hall Institute, being first. In his final year he gained second class honours in medicine and was first on the list, second class honours in surgery and third class honours in obstetrics. During the last two years of his course he was in residence at Ormond College. As an undergraduate he did not take a prominent part in the communal life of the College, but

he was popular and regarded by his fellows as an unusual and rather wonderful man.

His final honours gained him a residentship at Saint Vincent's Hospital, Melbourne, where he remained for a second year as Registrar. After leaving the hospital he was appointed Medical Superintendent at the Bendigo Hospital. In 1913 he took the degree of Master of Surgery and at Bendigo he began to obtain the reputation of a coming surgeon. At this time he turned his attention to the study of the pathology of the nervous system.

He remained at Bendigo until October, 1916. From August, 1915, the hospital had served as the base hospital to the Bendigo military camp and he had held the rank of Captain in the Australian Army Medical Corps Reserve. On October 25, 1916, he joined the Australian Imperial Force and embarked for active service with the rank of Captain. In January, 1917, he reached France and was attached for duty to the No. 2 Australian General Hospital at Wimereux, near Boulogne. At the end of January he was posted to the Third Division and was taken on strength of the 10th Field Ambulance. Later he was transferred to the 7th Field Ambulance (Second Division) and was temporarily attached to the 19th Battalion as Regimental Medical Officer and in April was attached to the 18th Battalion. He remained with this battalion until the following August. During the time he was with it the Division to which it belonged, took over the line from the Fourth Division, which had suffered badly in its attack on Bullecourt on April 11. Soon after the enemy delivered their counter attack on Lagnicourt, rushing the Australian position until driven out with great loss of life. During this action Robert Oliver Douglas behaved with great gallantry and coolness.



A man with his active temperament would find field life congenial and even rejoice in its dangers and discomforts; it is clear, however, that he was too good a surgeon to be long retained on the routine work of regimental medical officer. In August he was transferred to the No. 1 Australian Casualty Clearing Station, a position where his experience and ability as a surgeon found greater scope. It is said that when he reported for duty he was asked whether he would start straight away; he answered that he preferred to give anæsthetics for a while, until he had thoroughly familiarized himself with the surgical procedures involved in wound surgery. He did this for a month. This is characteristic of the thoroughness of all his actions.

In February, 1918, he was promoted to the rank of Major and in March he was appointed Surgeon Specialist to the surgical team at the Australian General Hospital at Rouen. In July he was detached with his surgical team for special work during the busy final months of the war. In August, 1919, he was placed in command of the No. 1 Australian General Hospital with the temporary rank of Lieutenant-Colonel. He held this position until March, 1920, when he relinquished the command. He was granted the honorary rank of Lieutenant-Colonel on his return to Australia. He was demobilized in September, 1920.

For a while he was in private practice at Toowoomba, Queensland, and was subsequently Medical Superintendent at Saint Vincent's Hospital, Sydney. Early in 1923 he joined Dr. Oliphant in partnership at Hamilton, Victoria.

He rapidly established his reputation as a brilliant surgeon throughout the western district. His skill as well as his personality soon gained for him the respect and affection of all classes over a very wide area. He was a member of the honorary staff of the Hamilton District Hospital and played a leading part in the management of the South-western "Sub-Division" of the Victorian Branch of the British Medical Association as Vice-President. He had just completed a work on cerebro-spinal meningitis, which had engaged his attention for many years. It is hoped that it will be possible to publish this work as a memorial volume. His operative work had placed him in the first rank of surgery. Death has taken him on the threshold of a brilliant career.

Dr. Fitzpatrick writes on behalf of his brother practitioners in and around Hamilton:

Since Dr. Douglas came among us, professional relations have steadily improved and confidence in each other has been built up. A much clearer understanding of the value of real cooperation in our hospital service has followed and opened up still wider possibilities of improvement in both private and public hospital practice.

His was a forceful and genial personality in which industry and imagination were combined with enthusiasm in all he undertook. Power to avoid non-essentials in search for essentials evidenced his possession of knowledge with wisdom. He knew the value of a healthy scepticism bred of intelligent visits to the *post mortem* room. His mental independence was always refreshing and a source of intellectual inspiration and fresh orientation to us. In the operating theatre where we can most vividly recall him, he was a master. His mental and physical alertness, mastery of detail and imperturbability gave him excellent poise in the presence of difficulties. His technique had become swift and sure and his surgical judgement ripe and self-reliant on sound experience. His teaching was noted for soundness, clearness and force. He held the attention and interest of his hearers to an unusual degree. His keen and discriminating judgement was recognized and utilized fully by his colleagues and the nursing staffs of the several hospitals.

His special knowledge and experience in hospital organization, economy and staffing were the greatest value to the Hamilton Hospital during its change to a purely honorary medical service and again during its graduation to the status of a base hospital.

Dr. Harold Learmonth, Vice-President of the Hamilton Hospital, writes:

The passing of R. Douglas, surgeon, is such a loss to this town and district that has hardly yet been realized, and his great ability is not only a local loss but consider it a national one. To our hospital which, owing to his great personality, has brought the honorary working of the hospital into such a harmonious one with all his fellow practitioners and to the high efficiency in which the hospital is recognized. This note of harmony and high standard is to a large extent the outcome of his exceptional energy for the well-being of our hospital. Throughout the western district it is generally realized that with such a body of medical men as identified in the honorary working of the institution, the poor and needy are catered for in no higher degree in any part of the State.

In the midst of an exceptionally busy life he has at all times made the time to meet and advise our Committee in various schemes for the betterment in efficiency of our institution and we will miss sadly his judicial advice, as the outcome of great past experience in matters that meant for the improvements of our hospital, who recognized that he put his best into all work whether administrative or professional.

Dr. J. R. Williams, Convalescent Hospital, Caulfield, writes:

The death of Dr. R. O. Douglas has been spoken of by everybody as a loss to the community. To meet Bob Douglas even casually was to be impressed by a dominating personality of a type rarely seen in any walk of life. Nobody questions his ability; wherever he has been his

surgical skill stands as a monument to him. A short sketch of his career as I knew it will reveal the many-sided nature of the man. After graduating he became a resident at his clinical school, Saint Vincent's Hospital, Melbourne. He passed his M.S. degree and was senior resident at Bendigo Hospital. Here his surgery claimed the admiration of his older colleagues and his earlier work stamped him as a man who would go far. Then came the war and the outbreak of meningitis at Bendigo camp. This disease claimed all his interest and energy. The Bendigo results attracted attention and he was asked to overlook the cases at the Melbourne Hospital. The records there show that from the date of his arrival the mortality rate appreciably declined. Dr. R. R. Stawell, the "honorary" in charge of the ward set apart for the cases of cerebro-spinal fever, said to me: "Douglas taught me much about the disease." He intended to write a thesis for his M.D. degree, but the material was too large and he continued accumulating. He never lost an opportunity of furthering his knowledge and if he had been spared a classic book would have been the result. The product of his labour and experience now may be lost to the profession.

Then came the period of his service abroad and there he did what we expected of him. After a period of regimental work he joined the No. 1 Australian Casualty Clearing Station. At first he refused to do surgery until he had learned what war surgery was. This was so characteristic of the man. What he did, he did well and until he could do it well, he refrained from attempting it. With the experience gained by watching and learning he started a career of brilliant war surgery which lasted until the armistice. The last nine months of the war it was my privilege to be his anæsthetist on surgical team work. I can bear testimony to his skill, his wonderful endurance and his colossal capacity for work. The results he achieved can never be traced, but his abdominal, chest and limb work were equally good. Close association with him during that time made one conscious of his strength and his weakness. In slack times no one ever dallied so earnestly. In busy times no one ever worked so hard. Many-sided is a trite word to describe his moods, one time stern, unbending, driving his team like pack mules, then caring for them like an elder brother. The gentle strain was often suppressed, but it would come up time and again.

When he returned, after a period of inactivity and a temporary set-back, he became Superintendent of Saint Vincent's Hospital, Sydney. There he met Sir Alexander MacCormick and the late Professor Hunter. Both men left a deep impression on him and set new ideals in front of him.

While he was in Sydney his surgical work maintained the high level he had set and he would have been content to stay if the inevitable step into private practice had not to be taken. He settled at Hamilton. He was described to me by a fellow practitioner in the district as "the man who gets us out of our worries." He shouldered them because he was capable of doing so. The whole district mourns him. The public knows what he did and what a standard of efficiency and service he set. His premature death robbed them of their sure shield. It robbed the local "medicos" of their source of inspiration and it robbed us who were privileged to know him well, of a sure and loyal friend.

Mr. Victor Hurley writes:

By the untimely death of R. O. Douglas at the zenith of his powers the medical profession of Victoria as well as the general community has sustained a profound loss. He was a man of outstanding qualities in whom were combined to an unusual degree a keen and original intellect, a forceful personality and a great capacity for work. This enthusiasm and power of concentrated effort delighted in meeting and overcoming any difficulties and problems which confronted him, and also made him an acknowledged leader amongst his fellows.

His capacity for leadership was early recognized and he was the secretary and moving spirit of the Medical Students' Society in all its activities of his time. His influence was directly responsible for securing many improvements in the conditions of students' work at the university and the hospitals and in the social and other functions of the Society he was always to the fore. Despite these and other interests Douglas had a brilliant university career, taking high honours throughout. After graduation he became a resident medical officer at Saint Vincent's Hospital, Melbourne, and soon decided to concentrate his energies chiefly on surgical work. He obtained the Master of Surgery degree of the Melbourne University a year or two before the Great War and was appointed Medical Superintendent of the Bendigo Hospital at a time when most of its surgical work was carried out by that officer. His ability was soon manifested and he acquired rapidly a reputation as a capable and resourceful surgeon. He afterwards went on active service abroad and the later stages of the campaign found him allotted for surgical duty in the forward areas at dressing stations and casualty clearing stations. Here his surgical ability, tireless energy and capacity for prompt decision and action made him a most valuable officer and he rendered excellent service.

On his return to Australia he practised for a time at Toowoomba, Queensland, and later was Registrar at Saint Vincent's Hospital, Sydney, before he settled at Hamilton, where he worked up till his death. Although practising some two hundred miles from Melbourne, Douglas was a frequent visitor to the hospital clinics and laboratories of the city, taking an active part in discussing problems in which he was interested. He generally had some fresh and original point of view to advance, backed by sound clinical observations and intuition. At the time of his death he was engaged in organizing a scheme to establish a modern clinic or community hospital for the Hamilton district and was convinced of its practicability and prospects of success. His death will be sincerely mourned by a large circle of friends.

JOURNALS WANTED.

THE Commonwealth Serum Laboratories are desirous of purchasing copies of the *Australian Medical Journal* from the year 1856 to 1861 inclusive and from the years 1911 to 1914 inclusive, also Number 1, 1909, of the *Intercolonial Medical Journal of Australasia*, pages 1 to 56 inclusive and the *New South Wales Medical Gazette* from 1870 to 1875 inclusive. Members who have some or all of these journals, are requested to communicate with the Secretary, Commonwealth Serum Laboratories, Parkville, Victoria.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered under the provisions of Part I of the *Medical Act* 1915, of Victoria, as duly qualified medical practitioners:

Begg, Frank William, M.B., Ch.B., 1903 (Aberdeen), Terang.

Newell, John Alexander, M.B., Ch.B., 1891 (New Zealand), Northcote Road, Armadale.

Souter, James, M.B., Ch.B., 1902 (Aberdeen), Erin Street, Richmond.

Tunbridge, Ewen Ballantyne, M.B., B.S., 1926 (Univ. Melbourne), Penshurst.

NEW SOUTH WALES.

THE undermentioned have been registered under the provisions of *The Medical Act*, 1912 *and* 1915, of New South Wales, as duly qualified medical practitioners:

Marshall, Arthur Henry, M.B., Ch.B., 1925 (Univ. Bristol), King Street, Ashfield.
Murphy, Aileen Mary, M.B., B.S., 1926 (Univ. Melbourne), District Hospital, Albury.
Murphy, Walter Joseph, Lic. Lic. Midwif., 1901 (Royal College of Physicians, Ireland; Lic. Lic. Midwif., 1901 (Royal College of Surgeons, Ireland), Cox's Avenue, Bondi.

For additional registration:

Clowes, Arthur Lynton, F.R.C.S. (Edinburgh), 1927.
Smith, Norman Ross, L.R.C.P. (London), 1923, F.R.C.S. (England), 1923.

Books Received.

CRAWFORD W. LONG AND THE DISCOVERY OF ETHER ANESTHESIA, by Frances Long Taylor, with a foreword by Francis R. Packard, M.D.; 1928; New York: Paul B. Hoeber, Incorporated. Demy 8vo., pp. 250, with illustrations. Price: $4.00 net.

THE PEAKS OF MEDICAL HISTORY, by Charles L. Dana, A.M., M.D., LL.D.; Second Edition; 1928. New York: Paul B. Hoeber, Incorporated. Demy 8vo., pp. 105. Price: $3.50 net.

PHYSICAL DIAGNOSIS, by W. D. Rose, M.D.; Fifth Edition; 1927. St. Louis: The C. V. Mosby Company. Demy 8vo., pp. 819, with illustrations. Price: $10.00 net.

RATS AND HOW TO KILL THEM, by A. Moore Hogarth, F.E.S.; 1928. London: John Bale, Sons and Danielsson, Limited. Demy 8vo., pp. 45, with illustrations. Price: 6d. net.

AIDS TO OPHTHALMOLOGY, by N. Bishop Harman, M.A., M.B. (Cantab.), F.R.C.S. (England); Seventh Edition; 1928. London: Baillière, Tindall and Cox. Foolscap 8vo., pp. 244, with illustrations. Price: 3s. 6d. net.

GREEN'S MANUAL OF PATHOLOGY AND MORBID ANATOMY, Revised and Enlarged by A. Piney, M.D., M.R.C.P.; Fourteenth Edition; 1928. London: Baillière, Tindall and Cox. Demy 8vo., pp. 658, with illustrations. Price: 21s. net.

WOMAN AND LOVE, by Bernhard A. Bauer, M.D.; Translated from the German by Eden and Cedar Paul; 1927. London: William Heinemann (Medical Books) Limited. Royal 8vo., pp. 360. Price: 25s. net.

Diary for the Month.

APRIL 3.—New South Wales Branch, B.M.A.: Council (Election of Officers and Standing Committees).
APRIL 3.—Tasmanian Branch, B.M.A.: Council.
APRIL 4.—Federal Committee of the B.M.A.: Australia.
APRIL 4.—Victorian Branch, B.M.A.: Branch.
APRIL 4.—Western Australian Branch, B.M.A.: Council.
APRIL 5.—South Australian Branch, B.M.A.: Council.
APRIL 6.—Queensland Branch, B.M.A.: Branch.
APRIL 10.—Tasmanian Branch, B.M.A.: Branch.
APRIL 10.—New South Wales Branch, B.M.A.: Ethics Committee.
APRIL 12.—Victorian Branch, B.M.A.: Council.
APRIL 12.—New South Wales Branch, B.M.A.: Clinical Meeting.
APRIL 13.—Queensland Branch, B.M.A.: Council.
APRIL 16.—New South Wales Branch, B.M.A.: Organization and Science Committee.
APRIL 17.—Tasmanian Branch, B.M.A.: Council.
APRIL 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
APRIL 18.—Western Australian Branch, B.M.A.: Branch.
APRIL 18.—Central Northern Medical Association, New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi..

PERTH HOSPITAL, WESTERN AUSTRALIA: Bacteriologist and Biochemist.
ALFRED HOSPITAL: Honorary Physician to In-Patients, Honorary Physician to Out-Patients.
SYDNEY HOSPITAL: Medical Vacancies.
BALMAIN AND DISTRICT HOSPITAL: Resident Medical Officer.
WALTER AND ELIZA HALL INSTITUTE, MELBOURNE HOSPITAL: Research Studentship in Biochemistry.
THE PUBLIC SERVICE BOARD: Oculist.
COMMONWEALTH OF AUSTRALIA: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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